AD-A190 941 INSTALLATION RESTORATION PROGRAM RECORDS SEARCH FOR AIR FORCE PLANT 42 CALIFORNIA(U) CH2M HILL INC GAINESVILLE FL OCT 83 AFESC/DEV-42-IRP-002 F08637-80-G-0010-5003 1/3

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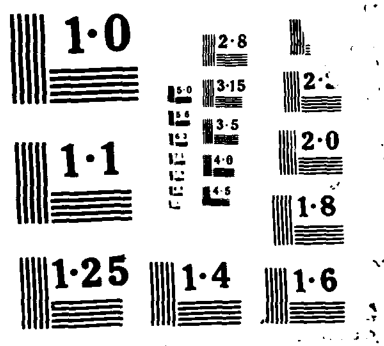
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INSTALLATION RESTORATION
PROGRAM RECORDS SEARCH

FOR

AIR FORCE PLANT 42, CALIFORNIA

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Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
TYNDALL AIR FORCE BASE, FLORIDA 32403

AND

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October 1983

Contract No. F08637-80-G0010-5003

88 4 4 137

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

AD-A190941

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS N/A
2a. SECURITY CLASSIFICATION AUTHORITY N/A	3. DISTRIBUTION/AVAILABILITY OF REPORT Unlimited
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) N/A	5. MONITORING ORGANIZATION REPORT NUMBER(S) 42-IRP-002
6a. NAME OF PERFORMING ORGANIZATION CH_2M Hill 6b. OFFICE SYMBOL (If applicable) N/A	7a. NAME OF MONITORING ORGANIZATION USAF AFESC/DEV
6c. ADDRESS (City, State and ZIP Code) 7201 N.W., 11th Place Gainesville FL	7b. ADDRESS (City, State and ZIP Code) Tyndall AFB FL 32403
8a. NAME OF FUNDING/SPONSORING ORGANIZATION USAF ASD/PMD 8b. OFFICE SYMBOL (If applicable) ASD/PMDA	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER F08637-80-G0010-5003
8c. ADDRESS (City, State and ZIP Code) Wright-Patterson AFB OH 45433-6503	10. SOURCE OF FUNDING NOS. PROGRAM ELEMENT NO.: N/A PROJECT NO.: N/A TASK NO.: N/A WORK UNIT NO.: N/A
11. TITLE (Include Security Classification) IRP Phase I-Records Search, AF Plant 42	

12. PERSONAL AUTHOR(S)
CH_2M Hill

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Yr., Mo., Day)	15. PAGE COUNT
Final	FROM ____ TO ____	1983-October	110 (excluding Appendix)

16. SUPPLEMENTARY NOTATION
N/A

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB. GR.	~~IRP,~~ Installation Restoration Program, Air Force Plant 42 Hazardous Waste, Air Force Plant 42

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This report provides the Installation Restoration Program (IRP) Phase I-Records Search for Air Force Plant 42, Palmdale, California. This is a report of a study conducted to identify past potentially hazardous material disposal sites. Interviews and document searches were conducted to determine sites that were potentially contaminated.

(Keywords)

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS ☐	21. ABSTRACT SECURITY CLASSIFICATION Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL Mr Carl Stoltz	22b. TELEPHONE NUMBER (Include Area Code) (513) 255-3076 22c. OFFICE SYMBOL ASD/PMDA

DD FORM 1473, 83 APR EDITION OF 1 JAN 73 IS OBSOLETE.

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EXECUTIVE SUMMARY

A. INTRODUCTION

1. CH2M HILL was retained on April 4, 1983, to conduct the Air Force (AF) Plant 42 records search under Contract No. F08637-80-G0010-5003, with funds provided by Aeronautical Systems Division (ASD).

2. Department of Defense (DoD) policy, directed by Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5, is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites on DoD facilities, control the migration of hazardous contamination from such facilities, and control hazards to health and welfare that may have resulted from these past operations.

3. To implement the DoD policy, a four-phase Installation Restoration Program has been directed. Phase I, the records search, is the identification of potential problems. Phase II (not part of this contract) consists of follow-on field work to determine the extent and magnitude of contaminant migration. Phase III (not part of this contract) consists of technology base development (evaluation of alternatives for remedial action) to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous conditions.

4. The AF Plant 42 records search included a detailed review of pertinent installation records, contacts with 9 government organizations for documents relevant to the records search effort, and an onsite installation visit conducted by CH2M HILL during the week of July 18 through July 22, 1983. Activities conducted during the onsite visit included interviews with 38 installation employees, ground tours of installation facilities, a detailed search of installation records, and a helicopter overflight to identify past disposal areas.

B. MAJOR FINDINGS

1. The majority of industrial operations at AF Plant 42 have been in existence since 1954. The installation was initially constructed as a U.S. Army Air Corps base in 1940 and was later operated as the Los Angeles County Airport from 1946 to 1952. The major industrial operations have been related to the final assembly, flight acceptance testing, and maintenance and modification of jet aircraft. The major industrial operations include paint shops, major assembly facilities, subassembly facilities, final assembly and check-out facilities, aerospace ground equipment (AGE) maintenance shops, and vehicle maintenance shops. These industrial operations generate varying quantities of waste oils, recovered fuels, and spent solvents and cleaners. The total quantity of waste oils, recovered fuels, and spent solvents and cleaners generated ranges from 100,000 to 125,000 gallons per year. This range of total waste quantities is based on current estimates. Waste quantities are dependent on contractor workload and may vary greatly from one

time period to the next. Total waste quantities are believed to have been greater in the past, during periods of heavy contractor workload.

2. In general, the standard procedures for past and present industrial waste disposal practices have been as follows: (1) fire department training exercises (1954 to 1973) and (2) removal off AF Plant 42 for final disposition (1973 to present). More specific industrial waste disposal practices for each industrial site are summarized in Section IV.A.1, "Summary of Industrial Waste Disposal Practices."

3. Interviews with installation employees resulted in the identification of 25 past disposal or spill sites at AF Plant 42 and the approximate dates that these sites were active (see Figure 1 for site locations).

C. CONCLUSIONS

1. Information obtained through interviews with installation personnel, installation records, and field observations indicate that hazardous wastes have been disposed of on AF Plant 42 property in the past.

2. Direct evidence (confirmed by laboratory analyses) of contaminant migration exists for Site No. 2-9, Fuel-Contaminated Ditch.

3. Indirect evidence (confirmed by visual observation) of contamination exists at Site No. 2-1, Paint Waste Disposal Ditch; Site No. 5-1, Engine Run-Up Area; and Site No. 7-1, Vehicle Washrack and Leaking Underground Tank.

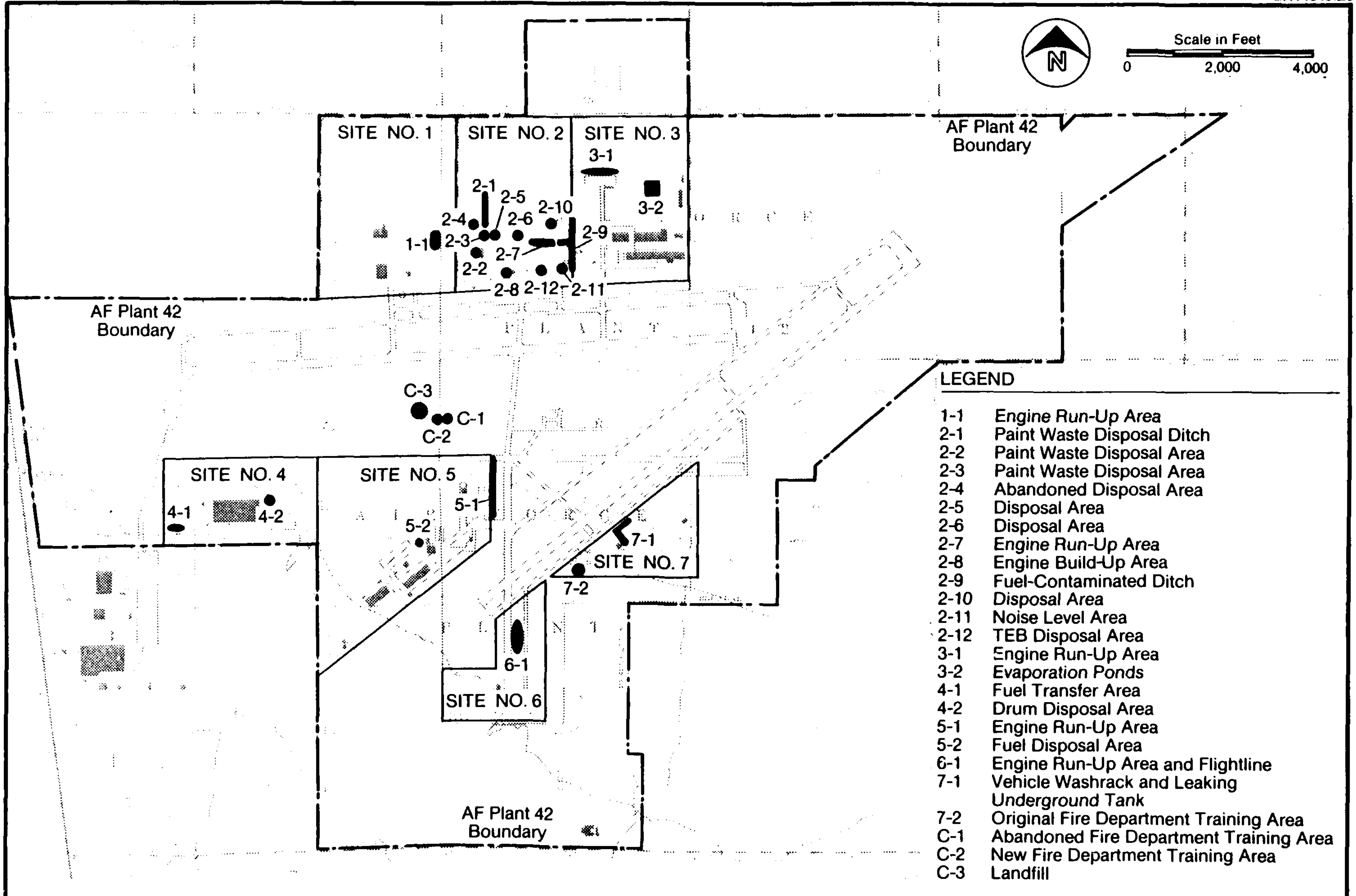

FIGURE 1.
Location Map of Identified Disposal and Spill Sites at AF Plant 42

4. No evidence of environmental stress due to past disposal of hazardous wastes was observed at AF Plant 42.

5. The potential for surface-water migration of hazardous contaminants is low. Due to the low annual precipitation rate, the high annual evapotranspiration rate, and percolation of stormwater runoff into the soil, the storm drainage system remains relatively dry most of the year.

6. The potential for ground-water migration of hazardous contaminants is low to moderate due primarily to: (1) low annual precipitation rate (approximately 9 inches per year), (2) high annual evapotranspiration rate (approximately 74 inches per year), (3) depth to ground water (approximately 300 feet), and (4) low to moderate range of soil permeabilities (4.5×10^{-4} to 1.4×10^{-2} cm/sec). Although only low to moderate, the potential does exist due to: (1) the absence of a continuous low-permeability confining stratum in the unsaturated zone, and (2) the presence of numerous abandoned wells which, if improperly sealed, may act as a direct pathway. The potential for contaminant migration is higher in areas where a hydraulic driving force may be present at times. Such areas include storm drainage ditches and fire department training areas.

7. Table 1 presents a priority listing of the rated sites and their overall scores. The following sites were designated as areas showing the most significant potential (relative to other AF Plant 42 sites) for environmental impact.

Table 1
PRIORITY LISTING OF DISPOSAL AND SPILL SITES

Site No.	Description	Overall Score
2-9	Fuel-Contaminated Ditch	82
2-1	Paint Waste Disposal Ditch	82
5-1	Engine Run-Up Area	71
7-1	Vehicle Washrack and Leaking Underground Tank	62
C-1	Abandoned Fire Department Training Area	59
7-2	Original Fire Department Training Area	58
2-7	Engine Run-Up Area	55
4-1	Fuel Transfer Area	52
C-3	Landfill	52
2-2	Paint Waste Disposal Area	51
2-3	Paint Waste Disposal Area	51
2-6	Disposal Area	49
1-1	Engine Run-Up Area	48
2-5	Disposal Area	48
2-8	Engine Build-Up Area	48
2-12	TEB Disposal Area	48
3-2	Evaporation Ponds	48
C-2	New Fire Department Training Area	48
2-4	Abandoned Disposal Area	47
3-1	Engine Run-Up Area	47
2-11	Noise Level Area	45
5-2	Fuel Disposal Area	45
6-1	Engine Run-Up Area and Flightline	45
2-10	Disposal Area	42

a. Site No. 2-9--Fuel-Contaminated Ditch

b. Site No. 2-1--Paint Waste Disposal Ditch

c. Site No. 5-1--Engine Run-Up Area

d. Site No. 7-1--Vehicle Washrack and Leaking Underground Tank

e. Site No. C-1--Abandoned Fire Department Training Area

f. Site No. 7-2--Original Fire Department Training Area

g. Site No. 2-7--Engine Run-Up Area

8. The remaining sites (Sites No. 1-1, 2-2 through 2-6, 2-8, 2-10 through 2-12, 3-1, 3-2, 4-1, 5-2, 6-1, C-2, and C-3), as well as the site that was not rated, are not considered to present significant environmental concerns. In general, these sites exhibited low pathways and low waste characteristics subscores. The presence of a hydraulic driving force was also absent at most of these sites.

D. RECOMMENDATIONS

1. A limited Phase II monitoring program is recommended to confirm or rule out the presence and/or migration of hazardous contaminants. The priority for monitoring at those sites which are high on the priority list (see Table 1) is considered moderate to high. Specifically, sampling is recommended for Site No. 2-9--Fuel-Contaminated Ditch, Site No. 2-1--Paint

Waste Disposal Ditch, Site No. 5-1--Engine Run-Up Area, Site No. 7-1--Vehicle Washrack and Leaking Underground Tank, Site No. C-1--Abandoned Fire Department Training Area, Site No. 7-2--Original Fire Department Training Area, and Site No. 2-7--Engine Run-Up Area. The location map of sites recommended for limited Phase II monitoring is shown on Figure 2. The limited Phase II program includes soil borings and soil sampling at all seven sites identified above. Details of the limited Phase II program are provided in Section VI.

2. The final details of the monitoring program, including the exact locations of sampling points, should be determined as part of the Phase II program. In the event that contaminants at levels of serious concern are detected, a more extensive field survey program should be implemented to determine the extent of contaminant migration.

3. Other environmental recommendations in addition to the Phase II sampling include the following: (1) installation of an oil/water separator at the vehicle washrack adjacent to Building No. 531, (2) removal of the underground waste oil tank adjacent to the vehicle washrack, (3) determination of the integrity of the underground waste tank located adjacent to Building No. 531, which was used for the storage of waste battery acid, (4) sampling of the digested sludge from the Sanitation and Water Plant and analysis for the characteristics of EP toxicity, (5) locating all

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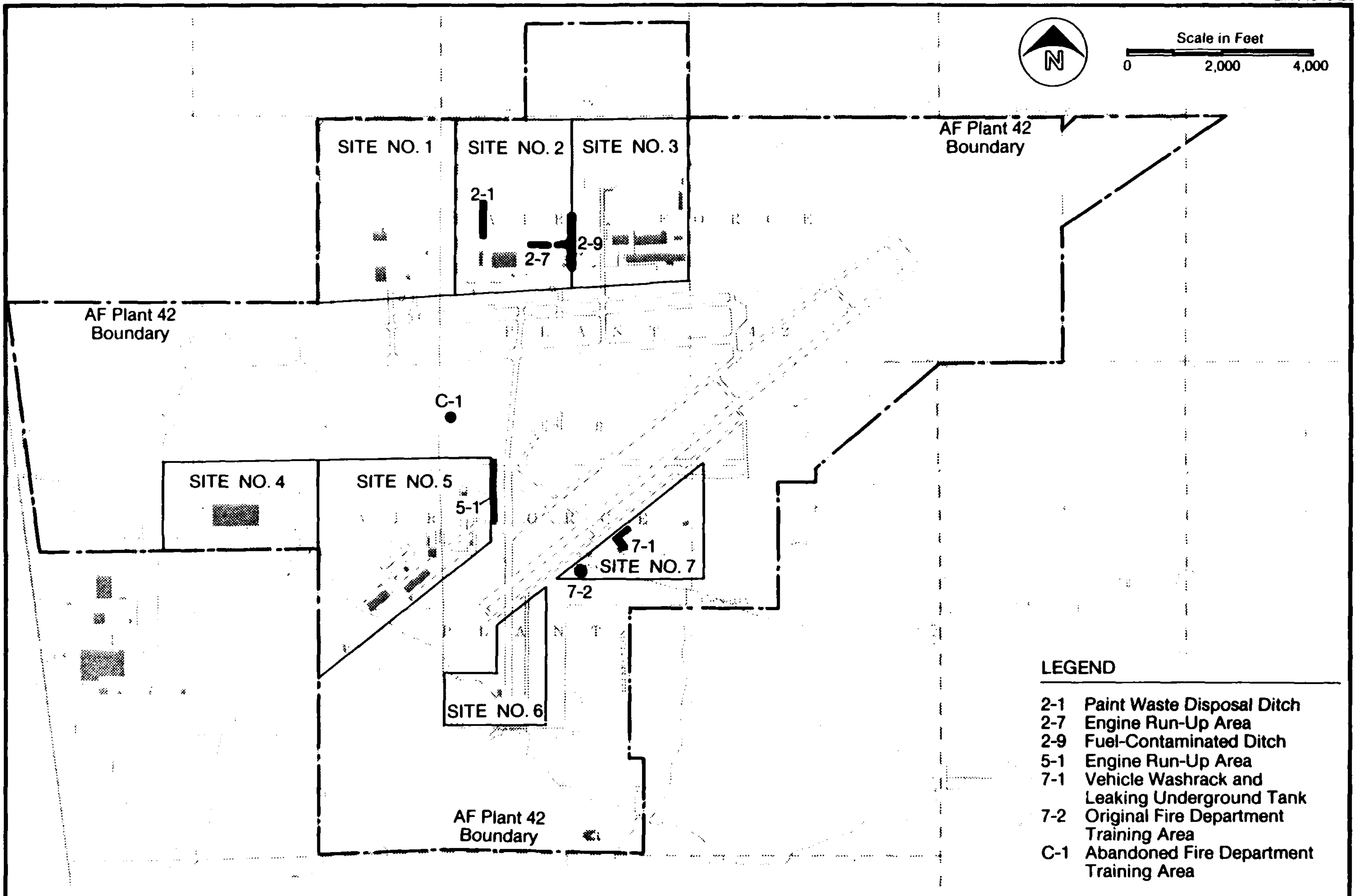

FIGURE 2.
Location Map of Sites Recommended for Limited Phase II Monitoring.

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abandoned wells on AF Plant 42 and properly sealing those in the vicinity of identified disposal and spill sites, (6) relocating the 2,000-gallon AG tank located in the storm drainage ditch between Sites No. 2 and No. 3 to a more acceptable location outside the drainage ditch, (7) locating and determining the status of the abandoned U.S. Army Air Corps POL tanks, and (8) determination of the status of the asbestos containing material at Site No. 2-4, Abandoned Disposal Area.

I. INTRODUCTION

A. BACKGROUND

The United States Air Force (USAF), due to its primary mission, has long been engaged in a wide variety of operations dealing with toxic and hazardous materials. Federal, state, and local governments have developed strict regulations to require that disposers identify the locations and contents of disposal sites and take action to eliminate the hazards in an environmentally responsible manner. The primary Federal legislation governing disposal of hazardous waste is the Resource Conservation and Recovery Act (RCRA) of 1976, as amended. Under Sections 6003 and 3012 of the Act, Federal agencies are directed to assist the Environmental Protection Agency (EPA) and state agencies to inventory past disposal sites and make the information available to the requesting agencies.

The Department of Defense (DoD) developed the current Installation Restoration Program (IRP) to ensure compliance with these hazardous waste regulations. The current DoD IRP policy is contained in Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5, dated 11 December 1981 and implemented by Headquarters Air Force message dated 21 January 1982. DEQPPM 81-5 reissued and amplified all previous directives and memoranda on the IRP. DoD policy is to identify and fully evaluate suspected problems associated with past hazardous material contamination, and to control hazards to health and welfare that may have resulted from these past operations. The IRP will be the basis for remedial actions on Air Force installations under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as clarified by Executive Order 12316. CERCLA is the primary

Federal legislation governing remedial actions at uncontrolled hazardous waste sites.

To conduct the IRP Hazardous Materials Disposal Sites Records Search for Air Force (AF) Plant 42, California, CH2M HILL was retained on April 4, 1983 under Contract No. F08637-80-G0010-5003 with funds provided by Aeronautical Systems Division (ASD). A location map of AF Plant 42 is shown on Figure 3.

The records search comprises Phase I of the DoD IRP and is intended to review installation records for the purpose of identifying possible hazardous waste-contaminated sites and assessing the potential for contaminant migration. Phase II (not part of this contract) consists of follow-on field work as determined from Phase I. Phase II consists of a preliminary survey to confirm or rule out the presence and/or migration of contaminants and, if necessary, additional field work to determine the extent and magnitude of the contaminant migration. Phase III (not part of this contract) consists of technology base development (evaluation of alternatives for remedial actions) to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous environmental conditions.

B. AUTHORITY

The identification of hazardous waste disposal sites at Air Force installations was directed by Defense Environmental Quality Program Policy Memorandum 81-5 (DEQPPM 81-5) dated 11 December 1981, and implemented by Headquarters Air Force message dated 21 January 1982, as a positive action to ensure compliance of Air Force installations with existing environmental regulations.

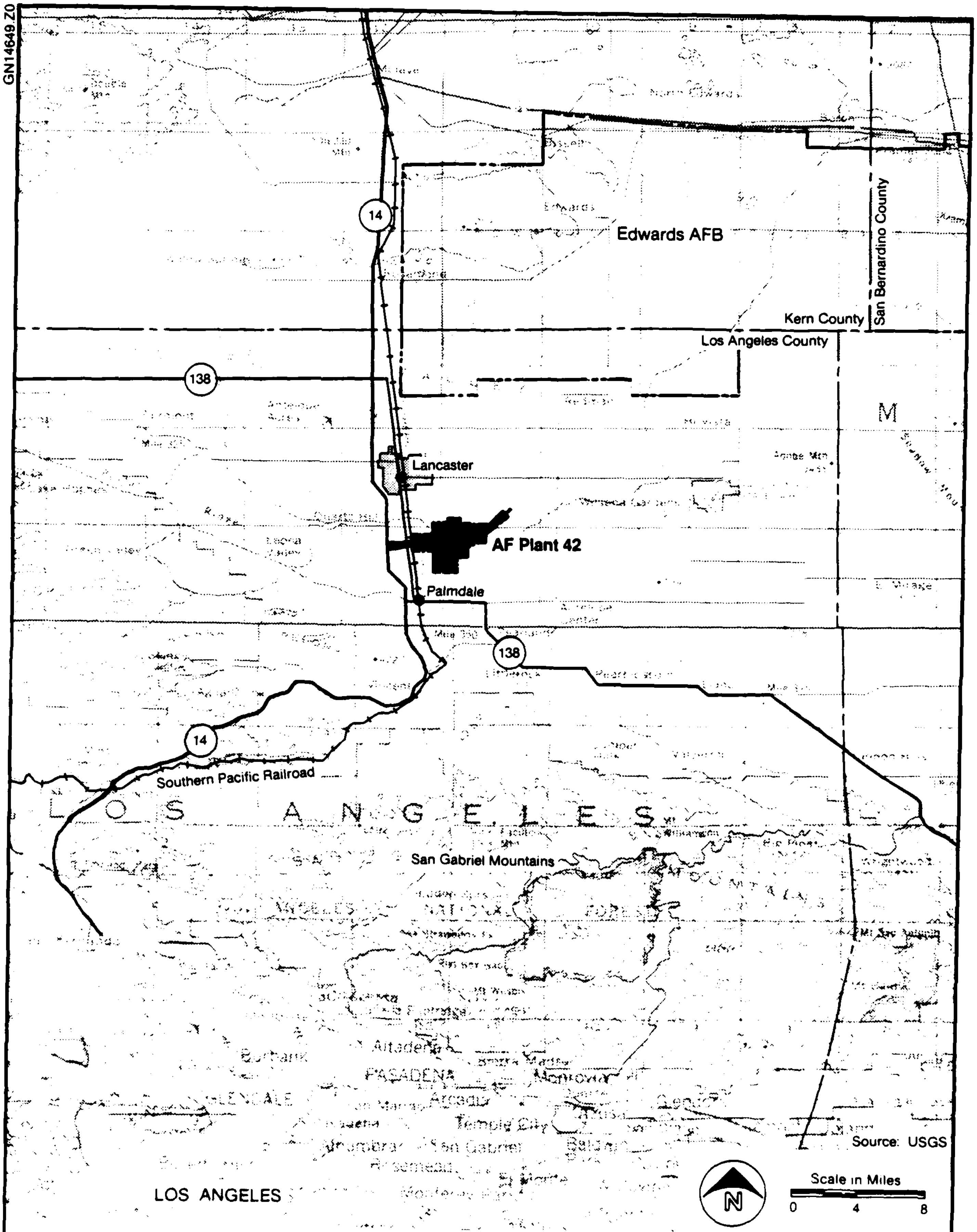

FIGURE 3.
Location Map of AF Plant 42.

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C. PURPOSE OF THE RECORDS SEARCH

The purpose of the Phase I records search is to identify and evaluate suspected problems associated with past hazardous material disposal sites and spill sites on DoD facilities. The existence and potential for migration of hazardous material contaminants were evaluated at AF Plant 42 by reviewing the existing information and conducting an analysis of installation records. Pertinent information included the history of operations, the geological and hydrogeological conditions which may have contributed to the migration of contaminants, and the ecological settings which indicated environmentally sensitive habitats or evidence of environmental stress. The evaluation is to determine which identified sites, if any, exhibit a significant potential for environmental impact and warrant further investigation. No sampling or field work is conducted during Phase I.

D. SCOPE

The records search program included a pre-performance meeting, an onsite installation visit, a review and analysis of the information obtained, and preparation of this report.

The pre-performance meeting was held at AF Plant 42, California, on April 26, 1983. Attendees at this meeting included representatives of the Air Force Engineering and Services Center (AFESC), Aeronautical Systems Division (ASD), Detachment 2 Air Force Contract Management Division (Det 2 AFCMD), Rockwell International Space Transportation and Systems Group, Lockheed Advanced Development Programs, Rockwell International North American Aircraft Operations, Northrop Aircraft Division, and Nero and Associates. The purpose of the pre-performance meeting was to provide

detailed project instructions, to provide clarification and technical guidance by AFESC, and to define the responsibilities of all parties participating in the AF Plant 42 records search.

The onsite installation visit was conducted by CH2M HILL from July 18 through 22, 1983. Activities performed during the onsite visit included a detailed search of installation records, ground tours, and helicopter overflight of the installation, and interviews with installation personnel. At the conclusion of the onsite visit, representatives from the Det 2 AFCMD were briefed on the preliminary findings. The following individuals comprised the CH2M HILL records search team:

1. Mr. Greg McIntyre, Project Manager/Environmental Engineer (M.S. Environmental and Water Resources Engineering, 1981).

2. Mr. J. Kendall Cable, Assistant Project Manager/Environmental Engineer (M.E., Civil Engineering, 1980).

3. Mr. Gary Eichler, Hydrogeologist (M.S. Engineering Geology, 1974).

4. Mr. Brian Winchester, Ecologist (B.S., Wildlife Ecology, 1973).

Resumes of these team members are included in Appendix A. Mr. Winchester was not a member of the site visit team.

Government organizations were contacted for information and relevant documents. Appendix B lists the organizations contacted.

Individuals from the Air Force who assisted in the AF Plant 42 records search include the following:

1. Mr. Myron Anderson, AFESC, Program Manager, Phase I.

2. Mr. Charles Alford, ASD, Environmental Programs Manager.

3. Major Michael Crosby, Det 2 AFCMD, Commander, AF Plant 42 Production Flight Test Installation.

4. Capt. Jim West, Det 2 AFCMD, Flight Operations Officer, AF Plant 42 Production Flight Test Installation.

5. Mr. Roy Gustafson, Det 2 AFCMD, Facility Manager, AF Plant 42 Production Flight Test Installation.

E. METHODOLOGY

The methodology utilized in the AF Plant 42 records search is shown graphically on Figure 4. First, a review of past and present industrial operations was conducted at the installation. Information was obtained from available records such as contractor files and real property files, as well as interviews with employees from the various operating areas of the installation. The information obtained from interviewees on past activities was based on their best recollection. A list of the 38 interviewees from AF Plant 42, with areas of knowledge and years at the installation, is given in Appendix C.

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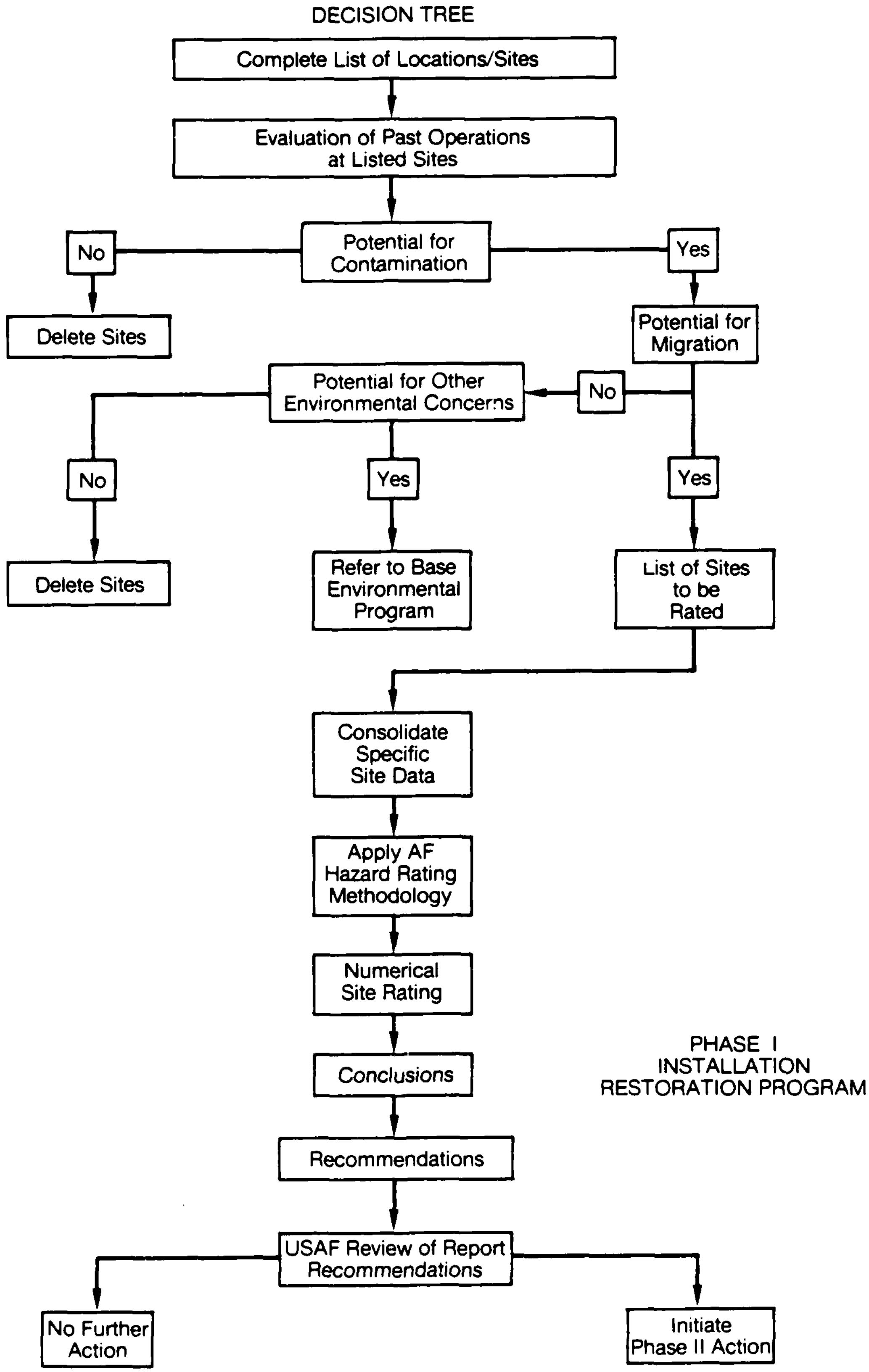

FIGURE 4.
Records Search Methodology.

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The next step in the activity review process was to determine the past management practices regarding the use, storage, treatment, and disposal of hazardous materials from all the industrial operations on the base. Included in this part of the activity review was the identification of landfill and burial sites; as well as other possible sources of contamination such as major PCB or solvent spills, or fuel-saturated areas resulting from significant fuel spills or leaks.

A helicopter overflight and a general ground tour of identified sites was then made by the records search team to gather site-specific information including evidence of environmental stress and the presence of nearby drainage ditches or surface-water bodies. These water bodies were visually inspected for any evidence of contamination or leachate migration.

A decision was then made, based on all of the above information, as to whether a potential exists for hazardous material contamination from any of the identified sites. If not, the site was deleted from further consideration.

For those sites at which a potential for contamination was identified, the potential for migration of this contamination was evaluated by considering site-specific soil and ground-water conditions. If there was no potential for contaminant migration, but other environmental concerns were identified, the site was referred to the installation environmental protection program. If no further environmental concerns were identified, the site was deleted from consideration. If the potential for contaminant migration was identified, then site specific information was evaluated and the site was rated and prioritized using the site rating methodology described in Appendix G, "Hazard Assessment Rating Methodology."

The site rating indicates the relative potential for adverse environmental impact at each site. For those sites showing a significant potential, recommendations were made to conduct a more detailed investigation of the potential contaminant migration problem under Phase II of the Installation Restoration Program. For those sites showing a low potential, no Phase II work was recommended.

II. INSTALLATION DESCRIPTION

A. LOCATION

AF Plant 42 is located in the northeastern portion of Los Angeles County, approximately 65 miles north-northeast of the City of Los Angeles, California. The plant is located in the southwestern corner of the Antelope Valley on the western fringes of the Mojave Desert. Palmdale, California is located 3 miles south of AF Plant 42 and Lancaster, California 5 miles north. The vicinity map of AF Plant 42 is shown on Figure 5. AF Plant 42 is situated on approximately 5,832 acres of land, of which 4,481 acres are joint use facilities, 1,063 acres are industrial sites, and 288 acres are easements. There are a total of seven industrial sites including four industrial facilities, one storage warehouse, one air terminal, and one facility maintenance site. The real estate map of AF Plant 42 is shown on Figure 6, and the site map is shown on Figure 7.

B. ORGANIZATION AND MISSION

The Palmdale Airport began as a U.S. Army Air Corps base in 1940 when the Works Progress Administration built the first concrete runways. Los Angeles County, California purchased the facility for use as a county airport when the Army declared it surplus after World War II in 1946.

Because of the serious problem of flight testing high performance jet aircraft in and over the heavily populated Los Angeles, California area, the USAF asked Congress in 1951 for authority to acquire the Los Angeles County Airport at Palmdale. The County's Palmdale Airport was well suited for aircraft flight testing since the Palmdale area was sparsely populated and had ideal weather conditions. In

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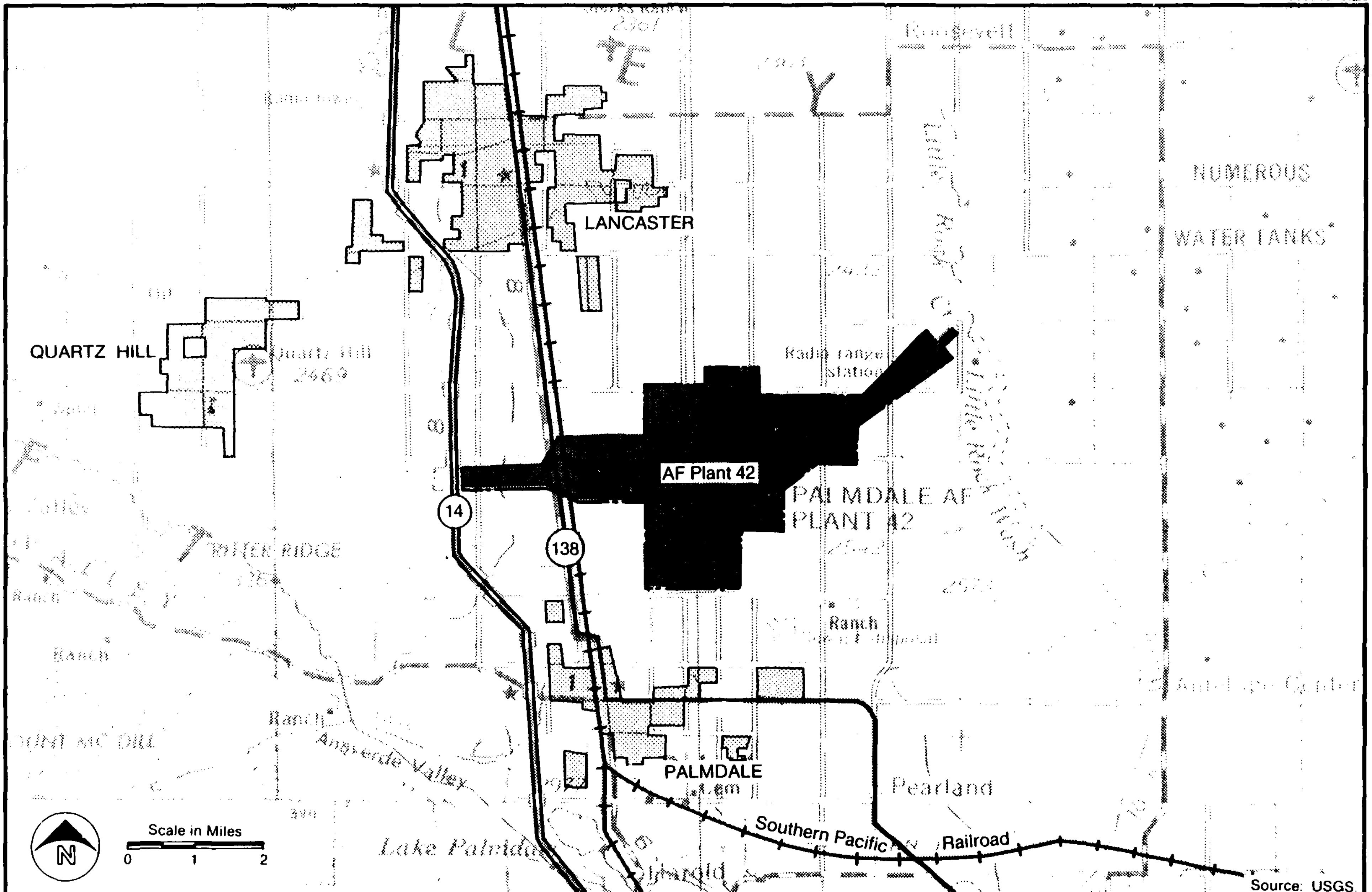

FIGURE 5.
Vicinity Map of AF Plant 42.

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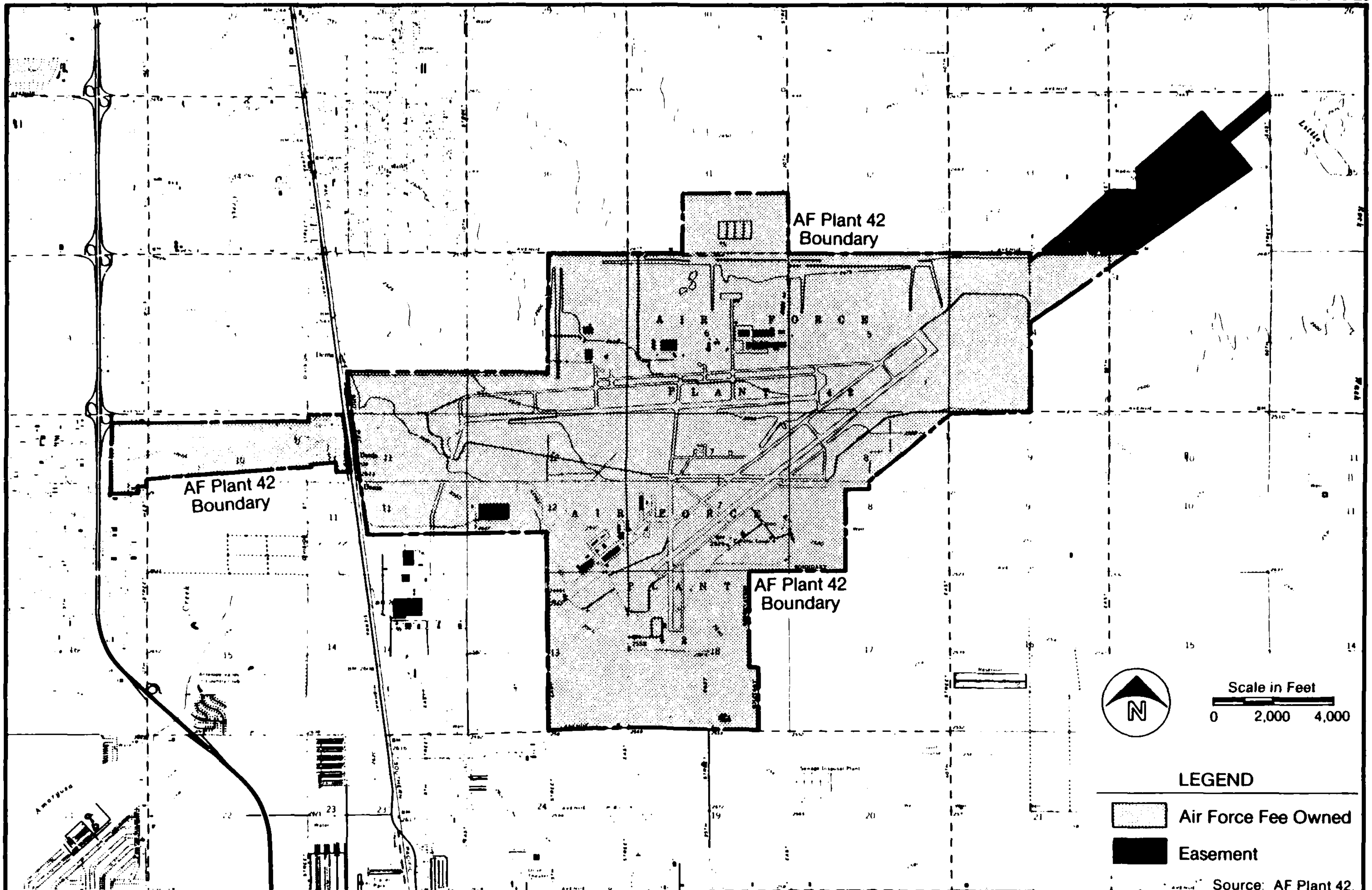

FIGURE 6.
Real Estate Map of AF Plant 42.

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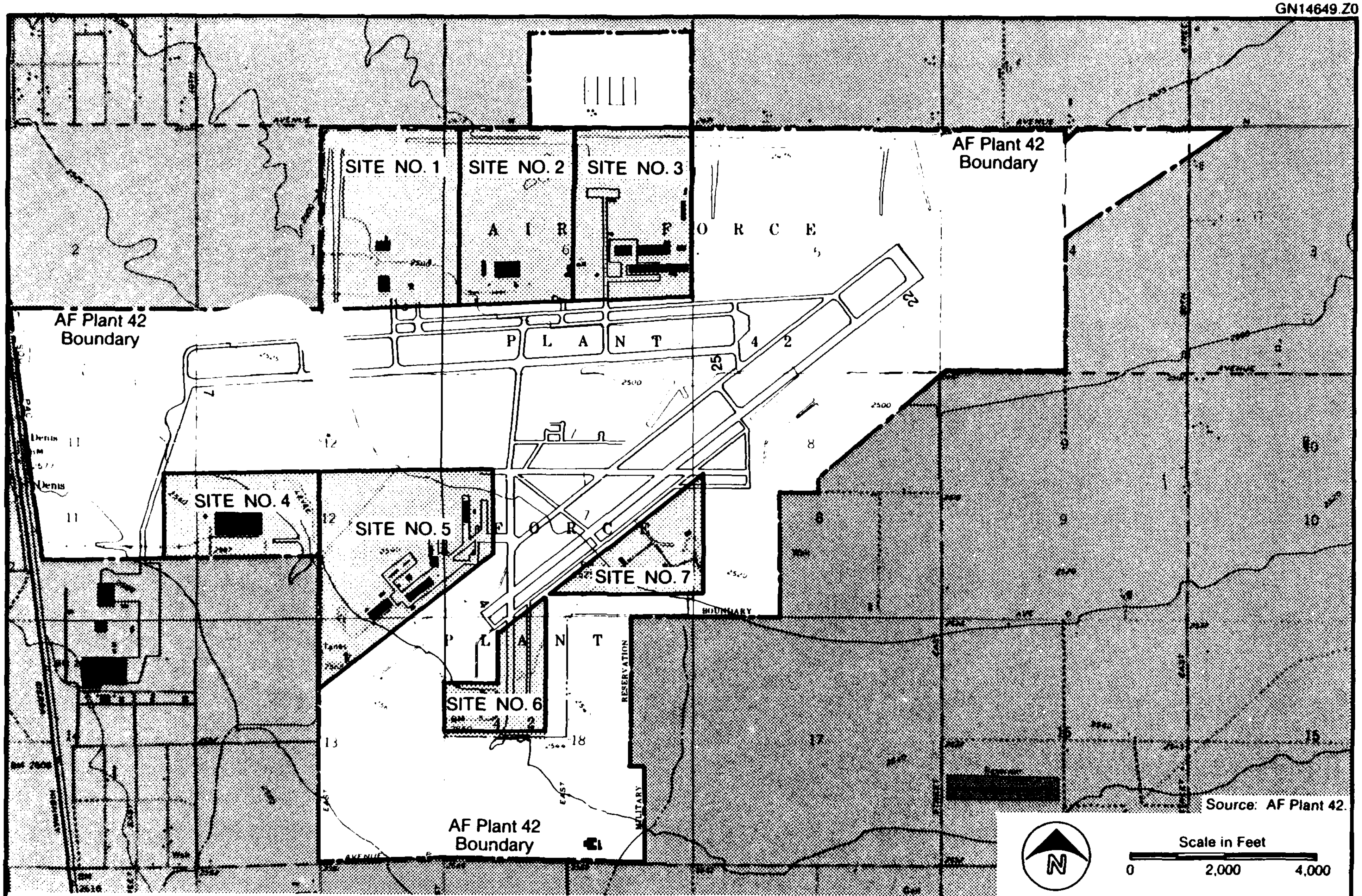

FIGURE 7.
Site Map of AF Plant 42.

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1952, the Los Angeles County Board of Supervisors granted the United States Government right-of-entry to the County's Palmdale Airport.

In 1953, North American Aviation, Inc. was granted exclusive use of approximately 272 acres to support aircraft production and engineering flight testing programs. Northrop Corporation was also granted exclusive use of approximately 220 acres for a final mating, production, and Air Force acceptance flight testing facility. Also during 1953, Lockheed Aircraft Corporation was authorized by the Government to construct joint use facilities and secure engineering design and architectural services. A primary result of this contract was the extension of the existing northeast-southwest runway from 7,000 to 12,000 feet and construction of related taxiways.

After approval of the Master Plan in 1953, the Palmdale Airport officially became Air Force Plant 42. In 1954, AF Plant 42 became Government-owned and in 1961 became officially known as the Production Flight Test Installation, Air Force Plant No. 42, Palmdale, California, which is the official name of the installation today.

The Air Force Contract Management Division (AFCMD) is the host of AF Plant 42. The primary mission of AF Plant 42 is to provide and maintain facilities for three purposes: (1) final assembly of jet aircraft, (2) production engineering and flight testing programs, and (3) Air Force acceptance flight testing of high performance jet aircraft manufactured by DoD contractors assigned to AF Plant 42.

As shown on Figure 7, there are seven industrial areas at AF Plant 42. These areas are used by companies under contract with the USAF to produce, maintain, and flight test

various jet aircraft and to maintain the industrial sites and common facilities. Since the activation of AF Plant 42, the following companies have had contracts with the USAF:

1. Rockwell International North American Aircraft Operations

2. Rockwell International Space Transportation and Systems Group

3. Lockheed Aircraft Corporation

4. Douglas Aircraft Corporation

5. Convair (Consolidated Vultee Aircraft Company)

6. Northrop Aircraft Division

7. Lockheed Air Terminal

8. Vinnel Corporation

9. ITT Technical Services, Inc.

10. Tumpane Company

11. Serv-Air, Inc.

12. Nero and Associates, Inc.

Hereinafter, Rockwell International North American Aircraft Operations will be referred to as "Rockwell Aircraft" and Rockwell International Space Business Support Services will be referred to as "Rockwell Space." Presented in Table 2 is a history of each of the seven industrial

Table 2
CONTRACTOR HISTORY AT AF PLANT 42

Location	Contractor	Time Period	Representative Aircraft
Site No. 1	Rockwell International North American Aircraft Operations	1954 to 1958	XB-70 Aircraft
	Lockheed Aircraft Corporation	1958 to 1973	S-3A and F-104 Aircraft
	Rockwell International Space Transportation and System Group and Aircraft Operations	1973 to Present	NASA Space Shuttle
Site No. 2	Northrop Aircraft Division	1953 to 1958	F-89 Aircraft
	Douglas Aircraft Corporation	1958 to 1962	A4-D and A4-J Aircraft
	Rockwell International North American Aircraft Operations	1962 to 1964	XB-70, F-100, T-39, A3-J, and F-86 Aircraft
	Lockheed Aircraft Corporation	1964 to Present	SR-71, U-2, and TR-1 Aircraft
Site No. 3	Consolidated Vultee Aircraft Company (Convair)	1954 to 1961	F-102 and F-106 Aircraft
	Northrop Aircraft Division	1958 to 1963	F-89 Aircraft
	Douglas Aircraft Corporation	1959 to 1961	A-4 Aircraft
	Rockwell International North American Aircraft Operations	1961 to 1967	XB-70 Aircraft
	Douglas Aircraft Corporation	1967 to 1971	A-4 Aircraft
	Rockwell International North American Aircraft Operations	1971 to Present	B-1 Aircraft
Site No. 4	Departmental Industrial Equipment Reserve Storage (DIERS)	1954 to 1956	None
	Machinery Overhaul Company	1954 to 1966	None
	Rockwell International North American Aircraft Operations	1966 to 1971	J-57 Aircraft
	Lockheed Aircraft Corporation	1971 to 1983	F-104, SR-71, P-3, and TR-1 Aircraft
	Rockwell International North American Aircraft Operations	1983 to Present	B1-B Aircraft (storage)
Site No. 5	Lockheed Aircraft Corporation[a]	1952 to 1972	F-104, TSV, T33, and F-94 Aircraft
	Convair	1955 to 1957	F-102 Aircraft
	Northrop Aircraft Division	1963 to 1973	F-5 Fighter and T-38 Trainer Aircraft
	Douglas Aircraft Corporation	1970 to 1979	A-4 Aircraft
	Northrop Aircraft Division[a]	1973 to Present	F-5 Aircraft
	Lockheed Aircraft Corporation	1979 to Present	TR-1 Aircraft
Site No. 6	Palmdale Airport	1954 to Present	Commercial Flights
	Convair	1955 to 1957	F-102 Aircraft
Site No. 7	Lockheed Air Terminal	1954 to 1963	Service Contractor
	Vinnell Corporation	1963 to 1964	Service Contractor
	ITT Technical Services, Inc.	1964 to 1973	Service Contractor
	Tumpane Company	1973 to 1975	Service Contractor
	ITT Technical Services, Inc.	1975 to 1978	Service Contractor
	Serv-Air, Inc.	1978 to 1981	Service Contractor
	Nero and Associates, Inc.	1981 to Present	Service Contractor

[a]Primary tenant at Site No. 5.

sites including the name of each contractor, their period of operation, and their representative aircraft or function since the activation of AF Plant 42.

The total work force at AF Plant 42 numbers approximately 6,130, which includes 6,100 civilian and 30 military employees.

A more complete history is presented in Appendix D.

III. ENVIRONMENTAL SETTING

A. METEOROLOGY

AF Plant 42 and the City of Palmdale are located at the southwestern corner of the Antelope Valley, which is a westward extension of the Mojave Desert. The San Gabriel Mountains, forming the southern rim of the valley, reach elevations of around 9,000 feet (6,500 feet above the city). Mt. San Antonio, 30 miles to the southeast, rises to an elevation of more than 10,000 feet. The Pacific Ocean is only 50 miles to the southwest, but because of the intervening rugged mountains, there is little marine influence on the weather experienced in the Palmdale area.

Weather in the vicinity of AF Plant 42 is generally dry, rather warm in the summer, and moderate during the winter (see Table 3). Sunshine is abundant. Historical data collected by the National Weather Bureau suggest that, on the average, 287 days of the year are clear, 44 are partly cloudy, and only 34 days are cloudy. Afternoon temperatures average in the upper 90's (°F) during July and August and the upper 50's during December and January. Night time lows average in the middle to lower 60's in the summer and lower 30's during the winter.

Rainfall is light, totaling about 8.87 inches per year, almost 90 percent of which occurs during the 6-month period from November through April. Thunderstorms rarely occur. Mean annual lake evaporation, commonly used to estimate the mean annual evapotranspiration rate, is estimated to be about 74 inches per year in the vicinity of AF Plant 42. Therefore, the annual net precipitation (mean annual precipitation minus mean annual evapotranspiration) for the AF Plant 42 area is approximately -65 inches per year.

Table 3
METEOROLOGICAL DATA SUMMARY FOR AF PLANT 42, CALIFORNIA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Temperature (°F)												
Record High	81	83	89	97	107	112	113	112	111	100	89	84
Record Low	9	16	21	28	31	39	43	38	36	27	19	14
Normal Maximum	57.6	60.8	66.6	73.6	80.9	89.1	97.8	96.7	91.8	79.7	67.5	59.4
Normal Minimum	31.4	34.4	38.3	43.7	49.6	56.8	65.2	63.3	57.0	47.5	37.1	33.0
Precipitation												
Record Maximum (in 24 hours)	2.44	2.43	2.39	0.88	0.35	0.15	0.28	1.05	1.02	1.63	1.63	3.43
Normal Mean	1.73	1.79	1.40	0.57	0.12	0.03	0.03	0.22	0.18	0.37	0.60	1.83
Mean Snowfall	2.1	0.4	0.2	T	0	0	0	0	0	0	T	0.2

Period: 1931-1962

Source: U.S. Dept of Commerce, Weather Bureau.

The prevailing wind direction is from the southwest throughout the year. Wind speeds of 15 mph or less are found more than three-quarters of the time, with winds less than 3 mph occurring 15 percent of the time. Studies suggest that peak wind speeds of 40 mph might be expected in the area as often as once in 2 years, while wind speeds of 55 mph might be expected once in 100 years.

B. GEOLOGY

AF Plant 42 is located in the southwestern corner of the Antelope Valley. This valley, bounded by the Garlock Fault on the northwest and the San Andreas Fault on the southwest, is part of the Sonoran Desert section of the Basin Ranges physiographic province (see Figure 8). The term "Mojave Desert region" is used frequently when referring to the general area in which the Antelope Valley occurs; however, this term does not describe a well defined physiographic region. The Sonoran Desert section includes the Antelope Valley as well as the remaining high desert section bounded by the two faults. The term "Antelope Valley" is applied to the western part of the triangular-shaped basin defined by the faults.

The two faults which form the boundary of this physiographic province also mark the boundary between the flat desert plain and the uplifted surrounding mountain ranges. The San Gabriel Mountains (part of the Transverse Ranges), trending northwest-southeast, adjoin the San Andres Fault zone and the Tehachapi Mountains (part of the Coastal Ranges), trending northeast-southwest, adjoin the Garlock Fault (see Figure 8). Elevations within the valley range from 2,300 to 3,500 feet above mean sea level (ft-msl) while the surrounding mountain ranges reach elevations of 9,399 ft-msl (San Gabriel) and 7,981 ft-msl (Tehachapi). Elevations at AF Plant 42 range from 2,580 to 2,475 ft-msl,

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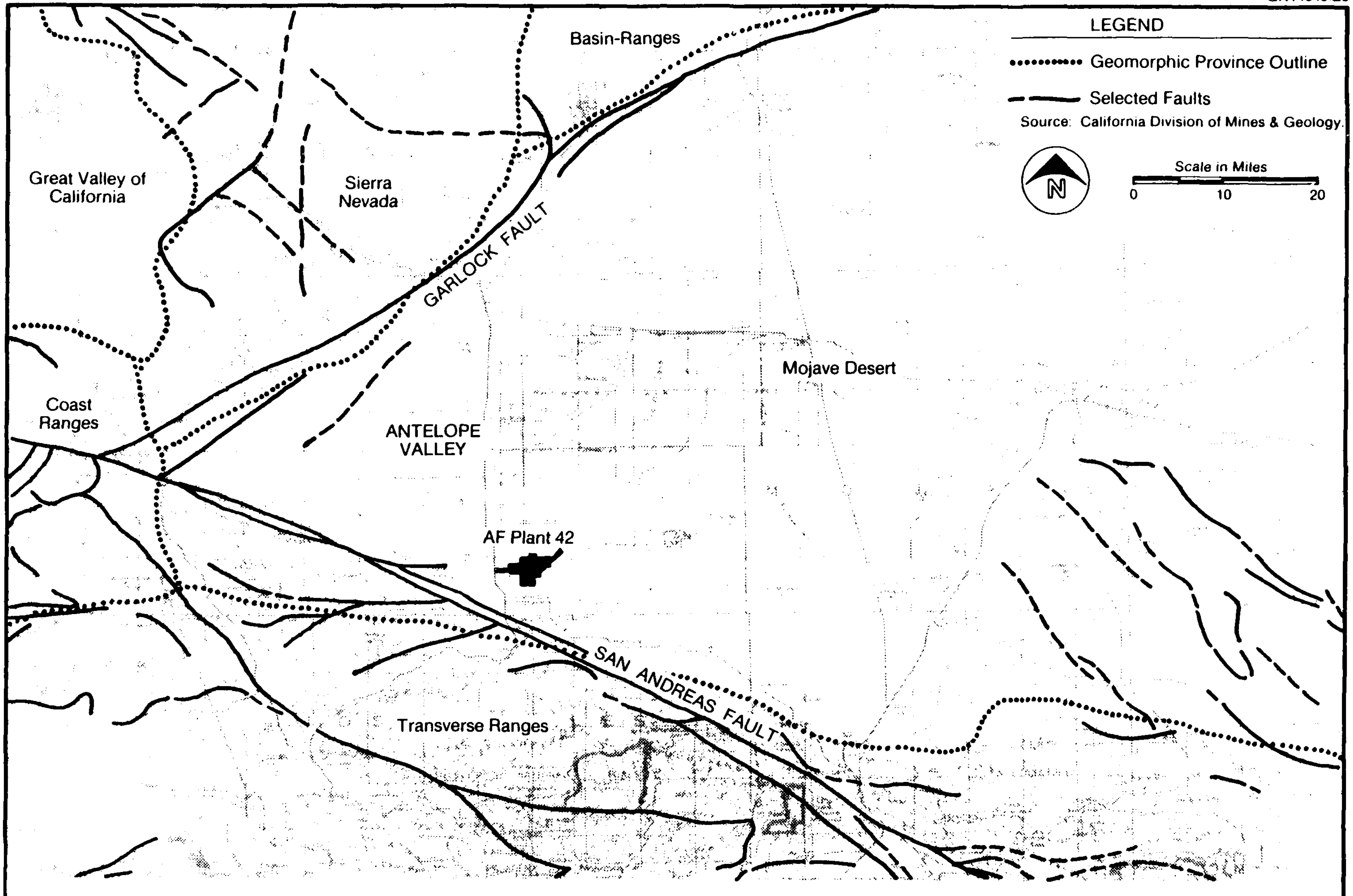

FIGURE 8.
Physiographic Map.

sloping gently from southwest to northeast. Figure 9 illustrates the topography and associated surface drainage flow at AF Plant 42.

Other physiographic features in the vicinity include dry lakes or playas such as Rosamond, Buckhorn, and the largest, Rogers Lakes, all located north of AF Plant 42 on Edwards AFB. The low relief of the valley floor is interrupted occasionally by remnant volcanic peaks which protrude through the unconsolidated sediments of the valley. Long Buttes, Saddleback Mountain, Alpine Buttes, and Piute Butte, all of which are located approximately 15 miles east of AF Plant 42 are examples of these remnant granitic volcanic features.

The Antelope Valley is a basin of internal drainage, meaning that rainfall and runoff entering the valley are either lost to evapotranspiration or infiltrate into the permeable sediments of the valley floor.

Surface-water features in the vicinity of the plant include Little Rock Wash, Amargosa Creek, Anaverde Creek, and several unnamed washes which are dry most of the time. Little Rock Reservoir and Palmdale Reservoir, the only "lakes" in the vicinity, are located approximately 7 miles east and 3 miles southwest, respectively, of AF Plant 42. The California Aqueduct, carrying water from northern California to the Los Angeles area, passes just southwest of the City of Palmdale.

Soil associations of AF Plant 42 consist of sandy loam and are typical of the entire valley. The soils are generally well drained and were formed from erosion of the surrounding granitic mountain ranges. They occur as alluvial fans and terraces, with slopes ranging from 0 to

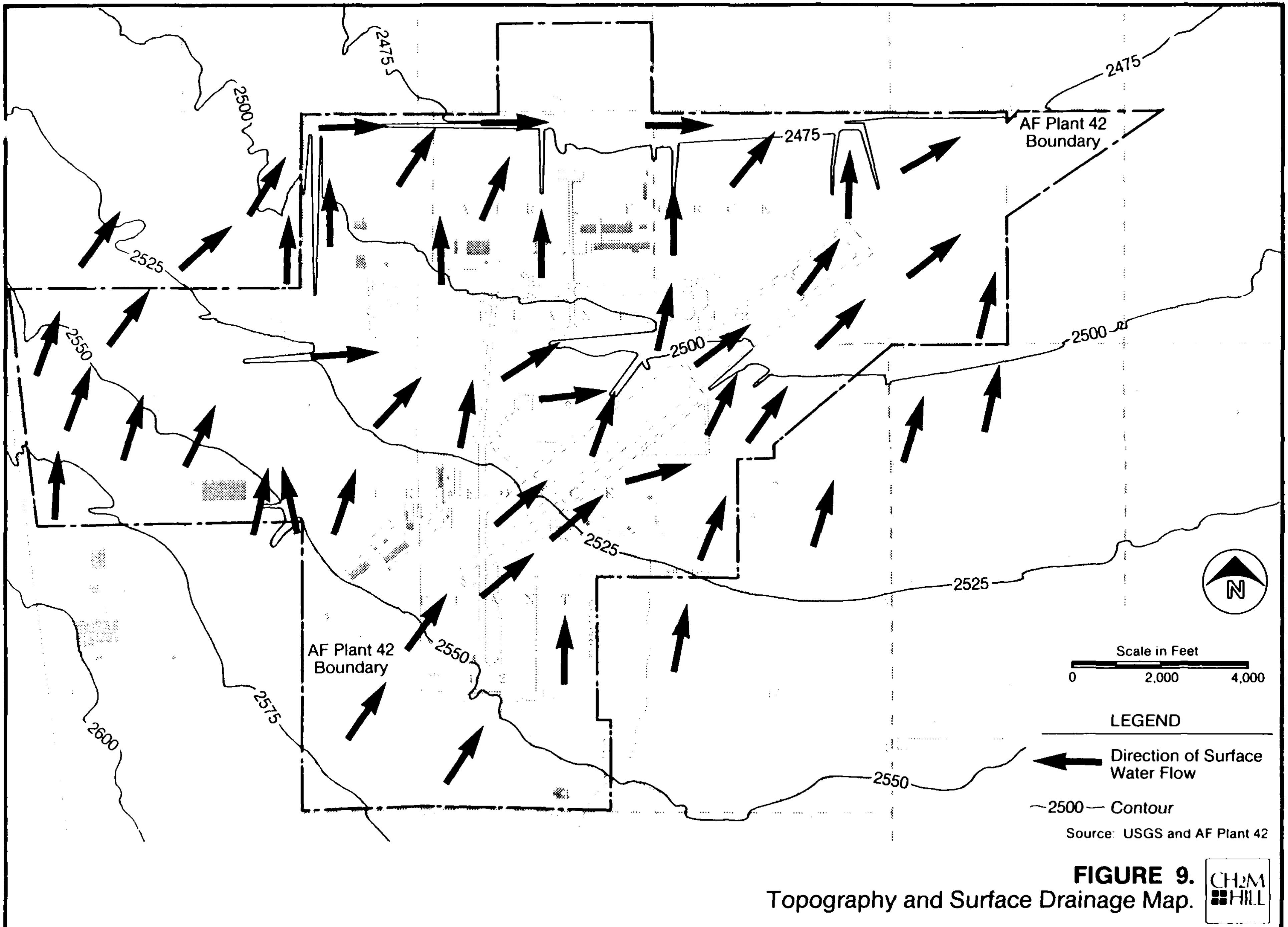

FIGURE 9.
Topography and Surface Drainage Map.

5 percent. Table 4 lists the predominant soil associations at AF Plant 42, and Figure 10 illustrates where on the site each soil type occurs. Table 4 also lists engineering properties for each soil type and general remarks indicating where each soil association occurs. Permeabilities of the sandy loam range from 4.5×10^{-4} to 1.4×10^{-2} cm/sec. Table 4 also lists relative permeabilities for each soil association occurring at AF Plant 42.

Structurally, the Antelope Valley is a graben, which is a large block of rock that has been down-thrown or dropped relative to the surrounding terrain. The graben is formed along the vertical fault planes of the Garlock and San Andreas Faults. Surface water flowing from the surrounding mountains carried and deposited eroded sediments into the valley, filling it to its present elevation. The geologic map of the Antelope Valley is shown on Figure 11.

The alluvial deposits within the valley are comprised of clay, silt, sand, gravel, and boulders which extend downward beyond 1,800 feet, which is the greatest depth penetrated by exploration drilling. Geophysical studies suggest that the unconsolidated alluvial materials extend to a much greater depth. Figure 12 illustrates a general west-east geologic cross section taken approximately through AF Plant 42. From this cross section, it can be seen that the alluvium is subdivided into two units referred to as younger and older alluvium, respectively. The two members are separated by a gently dipping (southeastward) silt and clay stratum several hundred feet thick which acts as a confining bed in the vicinity of AF Plant 42. Around the periphery of the valley, the low-permeability confining bed is absent and the older and younger alluvia merge. The unconsolidated alluvia, both older and younger, are of

Table 4
PREDOMINANT SOIL ASSOCIATIONS AT AF PLANT 42

Soil Name	Map Symbol	Shrink-Swell Potential	Permeability (cm/sec)	Relative Permeability	Hydrologic Soil Horizon	Remarks
Adelanto Coarse Sandy Loam	AcA	Low	4.5×10^{-4} to 1.4×10^{-3}	Low	B	Most predominant soil type along Runway 7-25
Cajon Loamy Sand	CaA	Low	4.5×10^{-3} to 1.4×10^{-2}	Moderate	A	--
Cajon Loamy Sand, Loamy Substratum	CbA	Low (Moderate)	4.5×10^{-3} to 1.4×10^{-2} (4.5×10^{-4} to 1.4×10^{-3})	Moderate (Low)'	A	Most predominant soil type at at Sites 1, 2, and 3; ( ) refers to soil strata 36 to 52 inches
Cajon Loamy Fine Sand	CcA2	Low	4.5×10^{-3} to 1.4×10^{-2}	Moderate	A	--
Hesperia Fine Sandy Loam	HkA	Low	1.4×10^{-3} to 4.4×10^{-3}	Moderate	B	Most predominant soil type at Site No. 4
Rosamond Loamy Fine Sand	Rm	Low	1.4×10^{-3} to 4.4×10^{-3}	Moderate	C	Most predominant soil type at Sites No. 5 and 7
Rosamond Pine Loamy Sand	Ro	Low	4.5×10^{-4} to 1.4×10^{-3}	Low	C	--
Rosamond Loam	Rp	Low	4.5×10^{-4} to 1.4×10^{-3}	Low	C	

Source: U.S.D.A. Soil Conservation Service.

Note: See Glossary for Hydrologic Soil Horizon definition.

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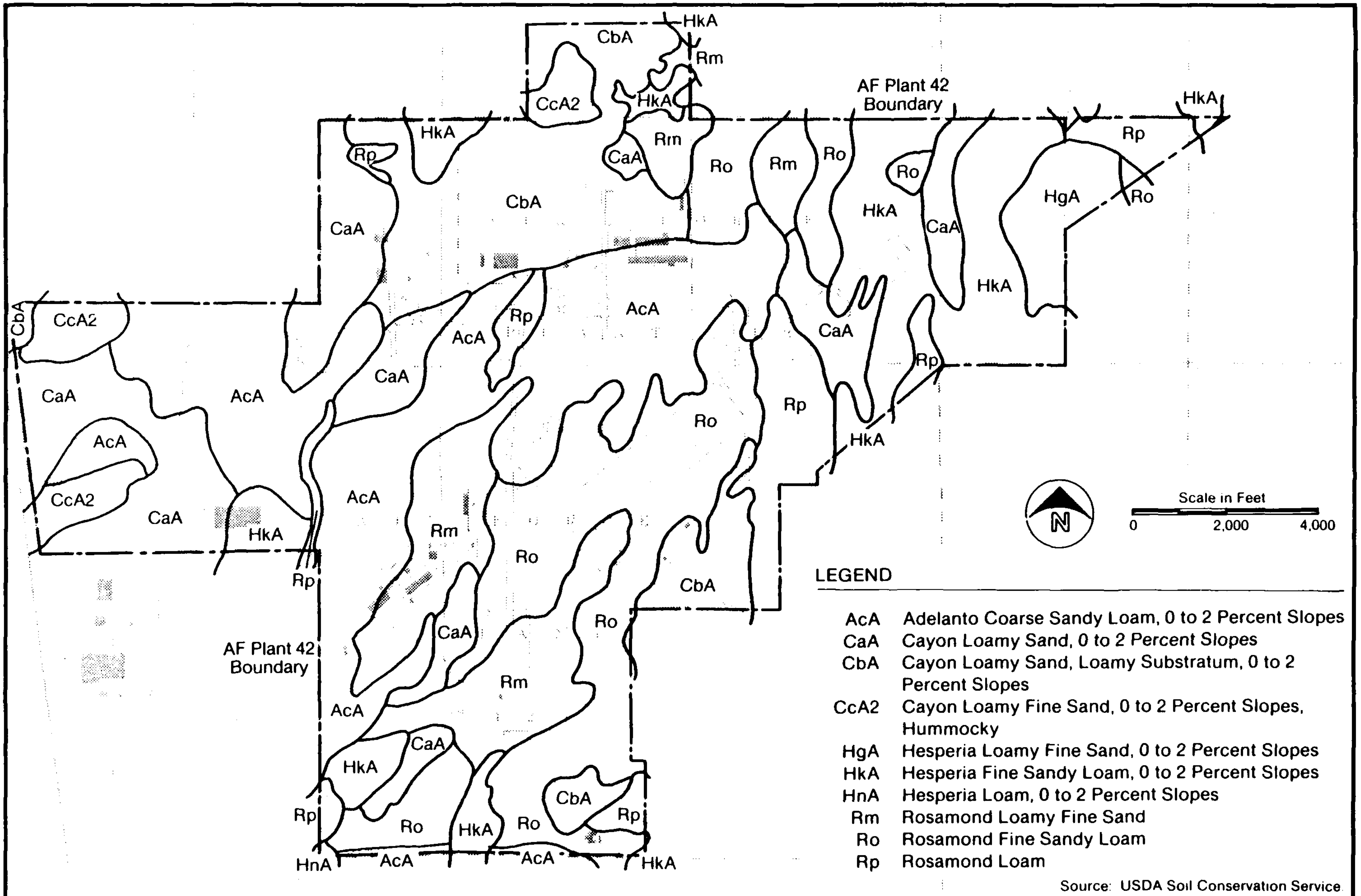

FIGURE 10. Soils Map.

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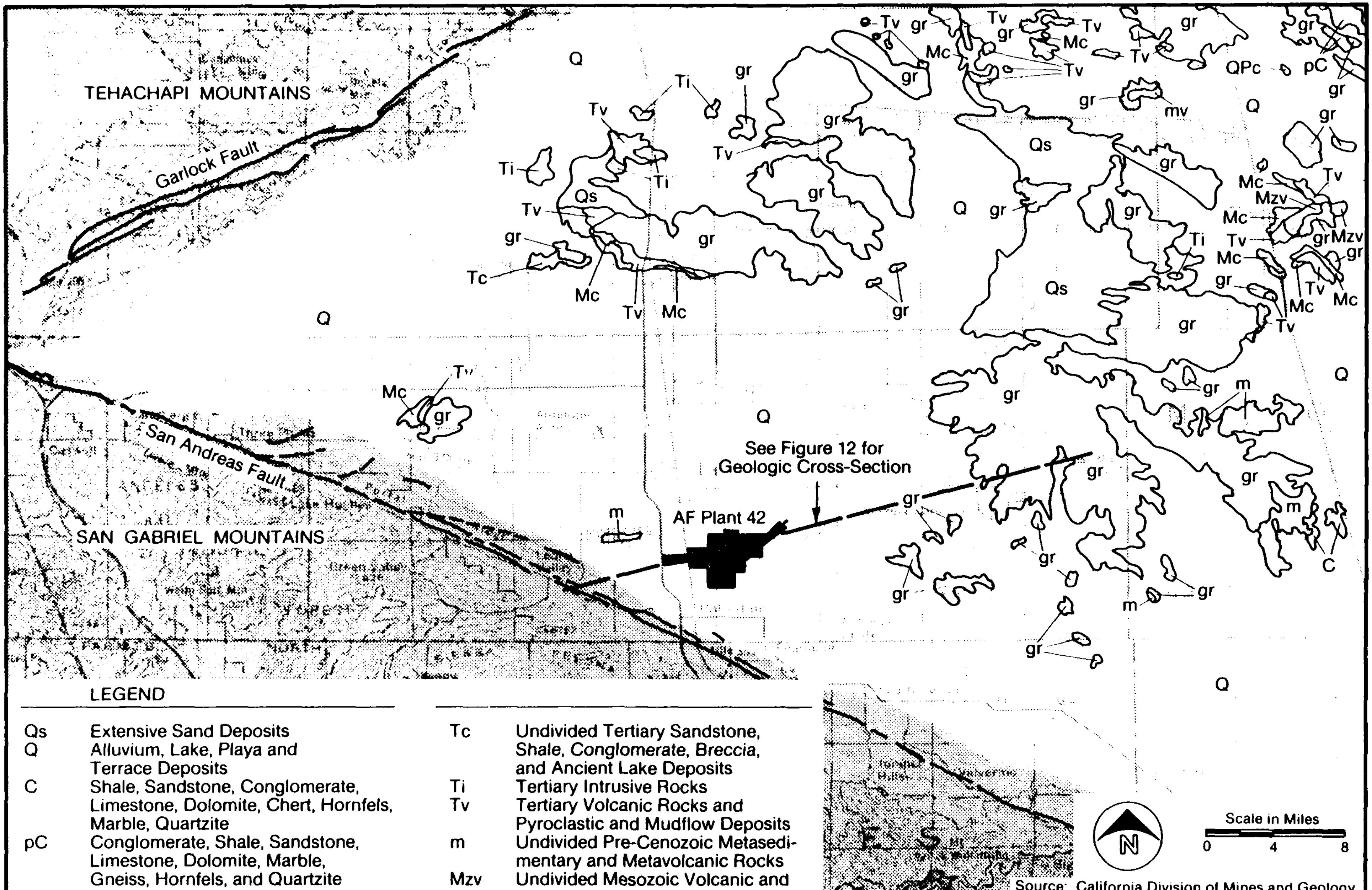

LEGEND

Qs	Extensive Sand Deposits
Q	Alluvium, Lake, Playa and Terrace Deposits
C	Shale, Sandstone, Conglomerate, Limestone, Dolomite, Chert, Hornfels, Marble, Quartzite
pC	Conglomerate, Shale, Sandstone, Limestone, Dolomite, Marble, Gneiss, Hornfels, and Quartzite
QPc	Pliocene and/or Pleistocene Sandstone, Shale, and Gravel
Mc	Sandstone, Shale, Conglomerate, and Fanglomerate
Tc	Undivided Tertiary Sandstone, Shale, Conglomerate, Breccia, and Ancient Lake Deposits
Ti	Tertiary Intrusive Rocks
Tv	Tertiary Volcanic Rocks and Pyroclastic and Mudflow Deposits
m	Undivided Pre-Cenozoic Metasedimentary and Metavolcanic Rocks
Mzv	Undivided Mesozoic Volcanic and Metavolcanic Rocks
mv	Undivided Pre-Cenozoic Metavolcanic Rocks
gr	Mesozoic Granite, Quartz Monzonite, Granodiorite and Quartz Diorite

Source: California Division of Mines and Geology.

FIGURE 11.
Geologic Map of Antelope Valley.

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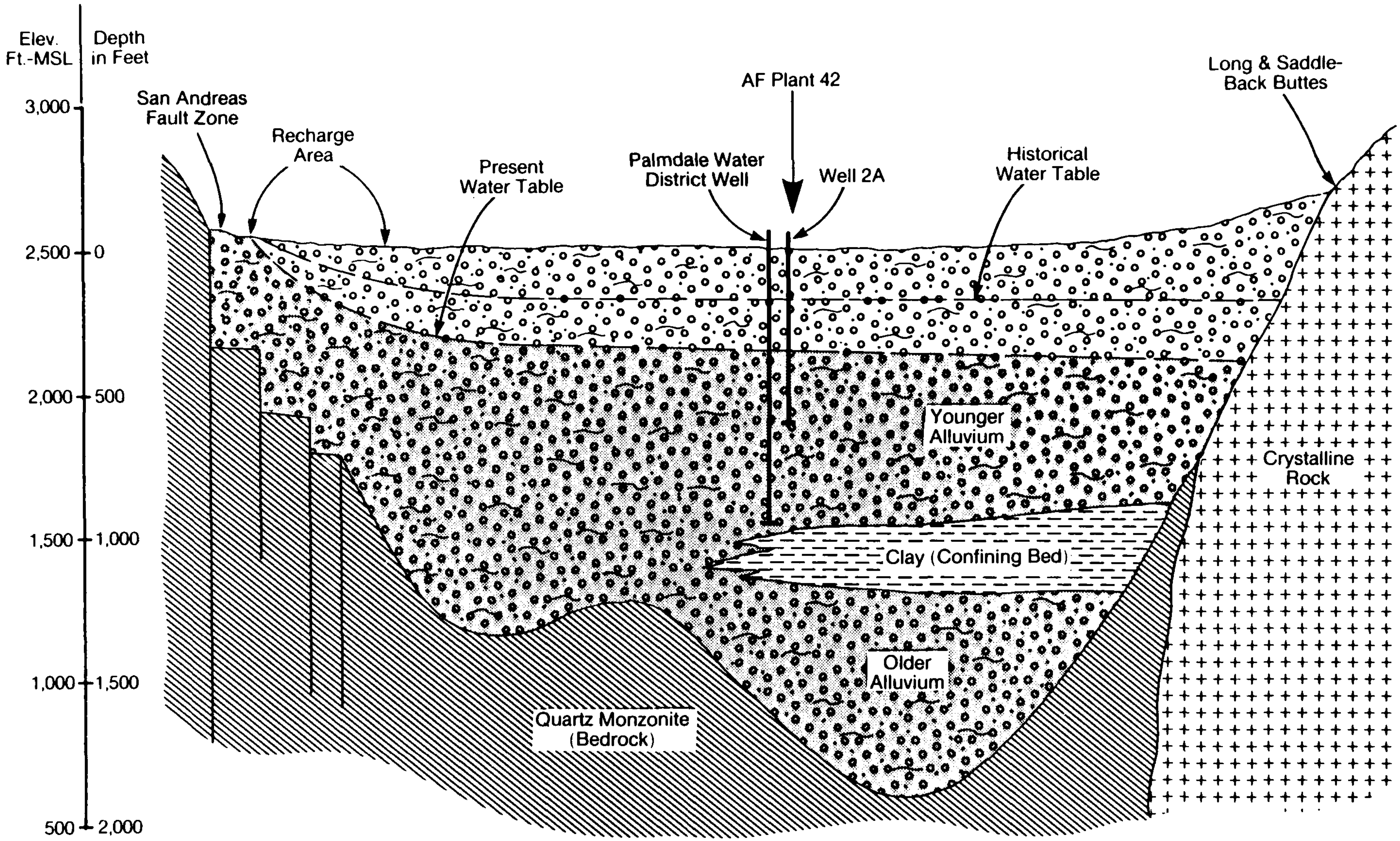

Source: USGS.

FIGURE 12.
Generalized West—East Geologic Cross Section.

significance to this study and are discussed later. Table 5 lists the geologic formations which occur within the study area and includes a brief description of each.

C. HYDROLOGY

Surface water, with the exception of that contained in man-made reservoirs and aqueducts, is almost non-existent within the desert during most of the year due primarily to low annual rainfall and high evaporation rates. Little Rock Wash, located approximately 2 miles east of AF Plant 42, is the most significant surface-water course in the area. This wash, which is dry most of the time, carries snowmelt in the spring and runoff from infrequent rainfall from Little Rock and Santiago Canyons which are in turn fed by runoff from the Angles National Forest located within the San Gabriel Mountains. As illustrated on Figure 9, storm drainage from northern Palmdale at one time was collected in an unnamed dry wash which flowed north, northeast across the west side of AF Plant 42. This wash is now intercepted and conveyed under the west end of Runway 7-25 by way of a tunnel and discharges to a large perimeter ditch which flows north then west along the plant boundary. The ditch terminates at the northeast corner of the site where stormwater evaporates and infiltrates into the ground.

Storm drainage from the east side of the plant is conveyed by another wash (unnamed) to the northeast discharging offsite. The individual sites within the plant are dissected with internal storm drainage ditches which convey runoff to the large perimeter ditch located along the northern boundary. Although surface-water courses within the study area are of little significance, runoff from the surrounding mountains is the principal source of ground-water recharge.

Table 5
GEOLOGIC FORMATIONS

Formation	Map Symbol	Age	Description	Remarks
Younger Lacustrine (Playa) Deposits	Qpd, Qpm, Qp	Quarternary	Clay or silt and minor lenses of sand and a little gravel; in most places include some chemically deposited salts. Saturated beneath the water table but generally do not yield large quantities of water to wells. Qpd, dry-type playa. Hard surface. No evidence that any part of playa, under natural conditions, discharge ground water. Depth to ground water beneath all parts of playa surface probably more than 10 feet. Qpm, moist-type playa. May have either hard or puffy surface. Depth to water beneath at least part of playa surface, under natural conditions, less than 10 feet. Evaporation occurs over all or part of playa surface of area marginal to playa. Qp, playa, character not determined.	Dry lakes
Younger Alluvium	QyA	Quarternary	Clay, sand, and gravel. Predominantly alluvial-fan deposits and valley-floor alluvium, but may include some dune-sand and lacustrine deposits. Where saturated yields large quantities of water, in most areas.	Important source of water at AF Plant 42
Older Alluvium	QoA	Quarternary	Clay, sand, and gravel. Generally cemented by clay minerals resulting from decomposition of feldspar in the deposits. Locally include terrace deposits. Where saturated, alluvium may yield large quantities of water to wells.	Potential source of water
Consolidated Rocks	CR	Precambrian to Pliocene	Predominantly igneous, sedimentary, and metamorphic rocks of the pre-Tertiary basement complex, and volcanic and continental rocks of Tertiary age. Yield no water to wells except small amounts from fractures and weathered zones.	Not a source of water

Ground water in the vicinity of AF Plant 42 occurs within the thick sequence of unconsolidated alluvia that underlies most of the Antelope Valley. These deposits, consisting of clay, silt, sand, gravel, and boulders, extend to at least 1,800 feet below land surface (bls) and are saturated with water from a depth of approximately 300 feet to the aquifer base.

The crystalline rock, which outcrops within the surrounding mountains, forms the impermeable base of the aquifer. Studies conducted in the vicinity of AF Plant 42 indicate that the amount of ground water in storage within the valley is greater than 40 million acre-feet.

As discussed above, the unconsolidated alluvium is divided into upper (younger) and lower (older) members separated by a confining bed in the vicinity of AF Plant 42. This confining bed separates the alluvium into two aquifers referred to as the "principal" and "deep" zones. The principal aquifer, from which AF Plant 42 draws its water, occurs from the water table (approximately 300 ft-bls) to the top of the confining bed (approximately 1,000 ft-bls). This aquifer is unconfined and receives recharge at the periphery of the valley as well as from direct infiltration from above. The deep zone, confined by the clay strata, occurs under artesian pressure and is recharged at the periphery of the valley but receives little or no direct recharge from above.

The peripheral recharge area is of the greatest significance to ground-water supply within the valley. The change in relief at the perimeter of the valley has resulted in the deposition of coarse, permeable materials.

Streams flowing from the mountains have a very high velocity due to the steep hydraulic gradient. This high velocity allows the moving water to pick up and transport not only silts and sand but also much larger-diameter sediments. Once the stream reaches the valley, the hydraulic gradient is drastically reduced and thus the velocity decreases significantly. Moving at the slower pace, the stream can no longer transport the large-diameter, coarse materials. Therefore, the coarsest materials are deposited close to the mountain/valley interface, with finer and finer materials dropped farther and farther out into the basin. This process has occurred throughout the depositional history of the basin and as a result the valley is bounded by coarse perimeter materials. Presently, therefore, when streams discharge from the mountains, much of the water infiltrates through the stream bed and then through the coarse materials at the valley boundary, thereby recharging the aquifers below.

Direct recharge from precipitation falling within the valley has been historically insignificant. This has not been a significant source of recharge in the past because of the low annual precipitation, high evaporation, and the relatively great depth to the water table. The recharge mechanism described above has, in the past, accounted for most of the water replenishing both the principal and deep aquifers. However, direct recharge is becoming more and more important as agricultural irrigation increases. Direct recharge from rainfall is still quite low; however, irrigation returns a portion of the water to the principal aquifer.

The transmissivity, a characteristic that defines the ability to transmit water, of the principal aquifer is quite variable, averaging approximately 100,000 gallons per day

per foot (gpd/ft), which is high for this type of deposit. The permeability of the unconsolidated sediments ranges from a low of 10 to a high of 5,000 gallons per day per square foot (gpd/ft^2).

Figure 13 illustrates the 1962 potentiometric surface of the principal aquifer. Water levels in 1962 at AF Plant 42 were at approximately elevation 2,290 ft-msl. Also from Figure 13, ground water at that time flowed from the recharge area at the base of the San Gabriel Mountains eastward toward a cone of depression centering approximately 8 miles northeast of AF Plant 42. The cone of depression illustrated on Figure 13 was caused by agricultural irrigation.

Figure 14 illustrates a more detailed 1983 potentiometric map at AF Plant 42. Ground-water levels which were used to develop the map are recent, and the elevation of the water table is now approximately 2,165 ft-msl, a decline of approximately 125 ft in 21 years. Actually, records indicate that from 1955 to the present, water levels in the Lancaster Subbasin (in which AF Plant 42 is located) have declined almost 200 feet.

Figure 15 illustrates this trend in water level decline within the Lancaster Subbasin. The decline is attributed to increased use of ground water for agricultural irrigation. It is significant to note that the water levels have stabilized since approximately 1975. In fact, close examination of records provided by Palmdale Water District and Antelope Valley East Kern Water Agency indicate that the water levels have recovered somewhat in the last year and a half. This may be due to a combination of factors, including an increased amount of precipitation (including snowfall in the mountains) occurring during that time and a stabilization of

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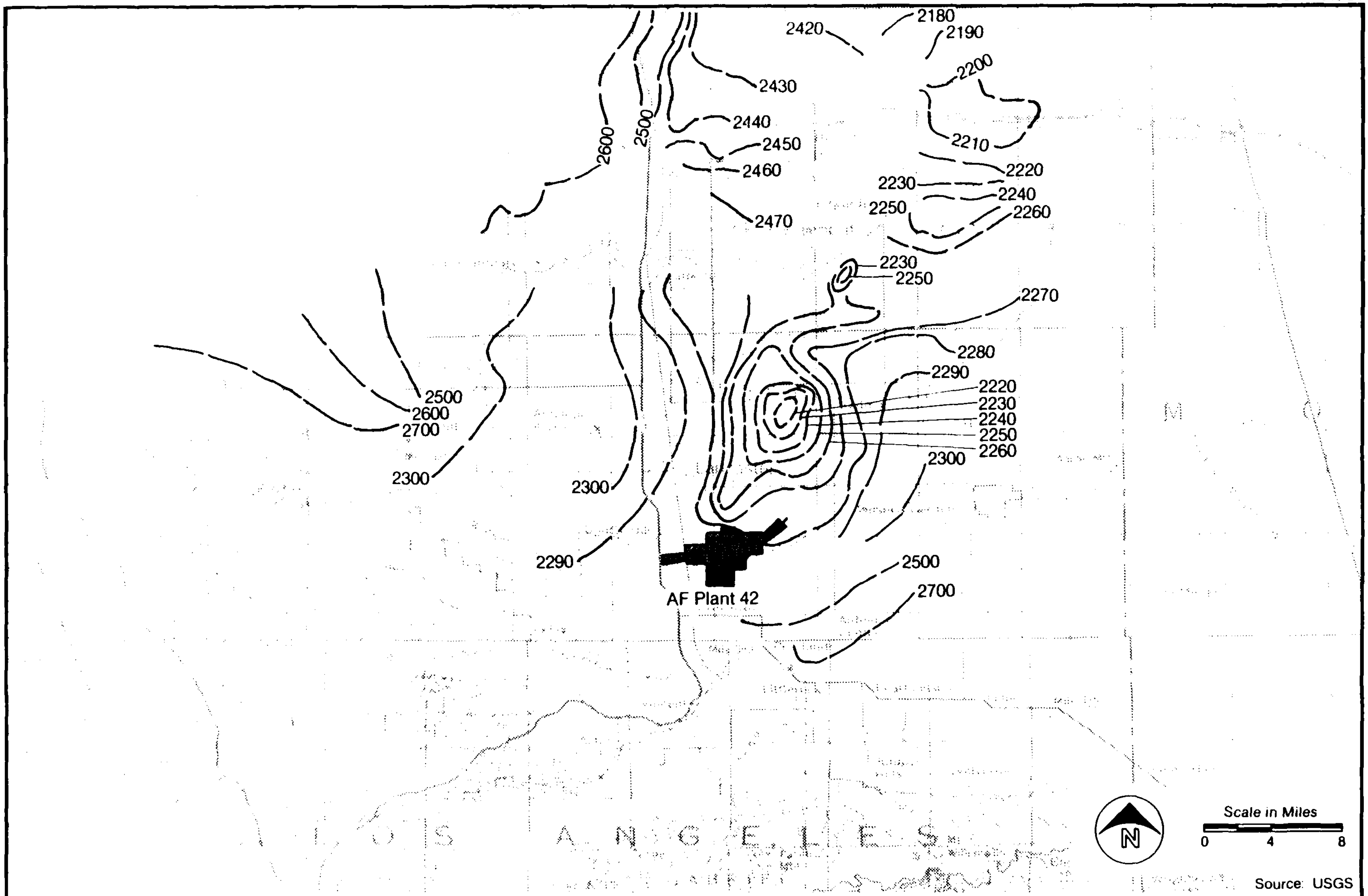

Source: USGS

FIGURE 13.
Potentiometric Map, 1962

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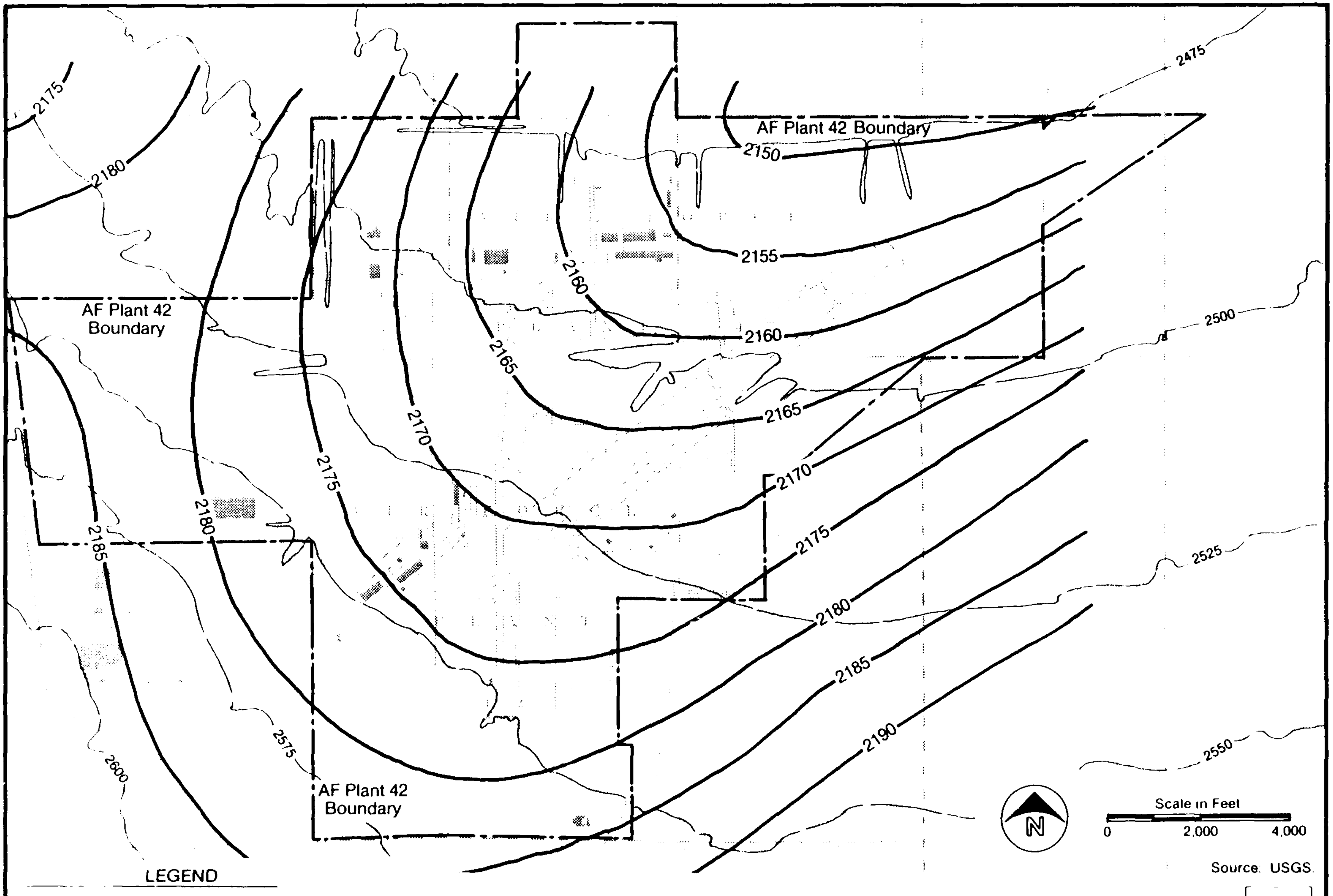

FIGURE 14. Potentiometric Map at AF Plant 42, 1983.

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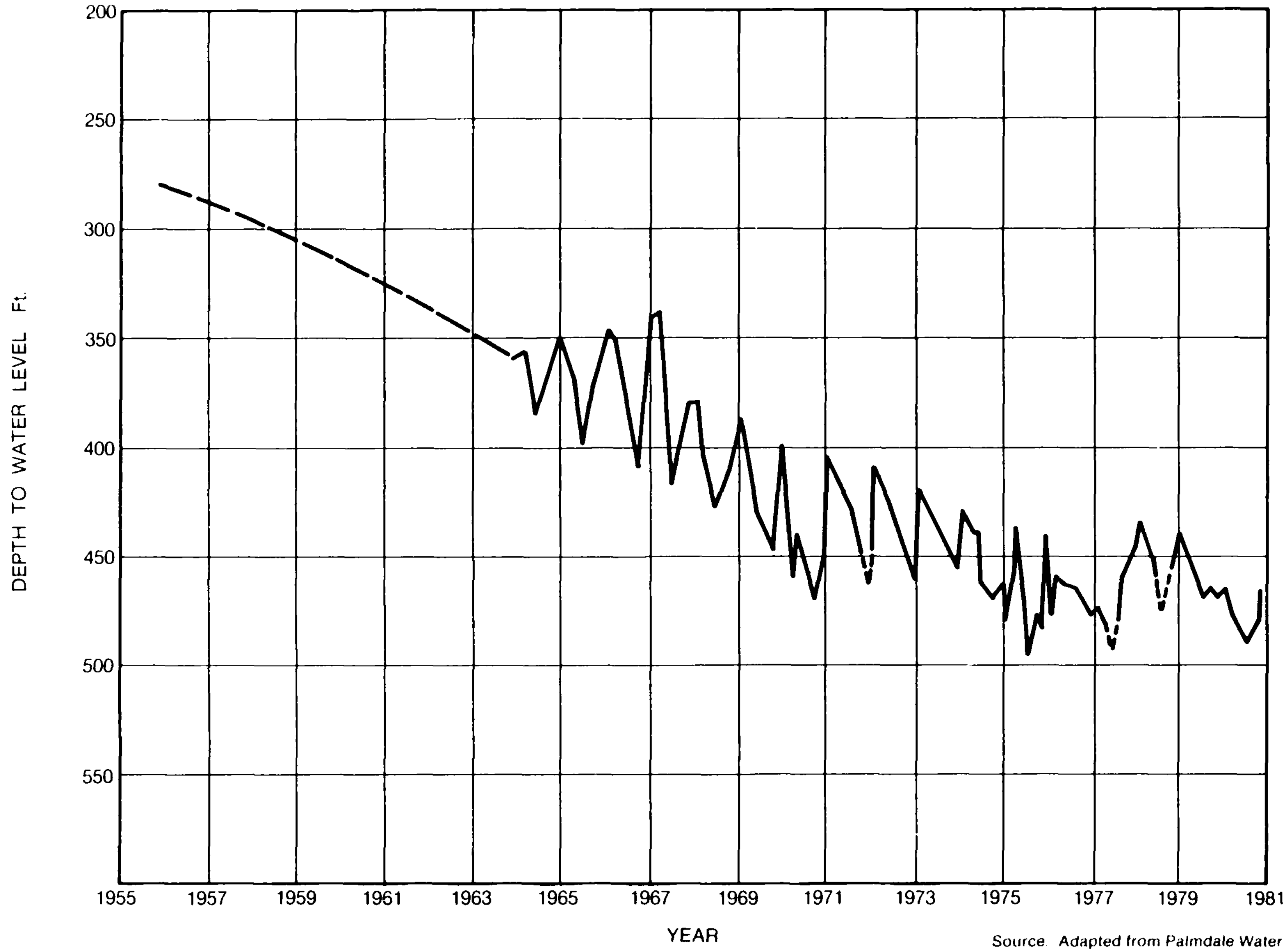

Source: Adapted from Palmdale Water District 1982 Water System Master Plan

FIGURE 15.
Historical Ground-Water Level Trends—Lancaster Subbasin.

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irrigation caused by the increasing cost to pump water from greater depths.

Water supply at AF Plant 42 is provided mostly from onsite wells. Some small amount of water is provided by Palmdale Water District to the administration area. Figure 16 illustrates the location of AF Plant 42 potable and fire protection wells currently in service. Also illustrated on Figure 16 are numerous abandoned irrigation wells which were constructed by private owners prior to expansion of the plant to its current size.

Figure 17 illustrates the well construction detail and geologic log for one of the plant wells (Well No. 2A, Fire Protection Well). Constructed in 1953, this well is typical of wells at the plant for which records exist. Figure 18 illustrates the construction details and geologic log for a well recently completed by Palmdale Water District, approximately 1/2 mile southwest of the plant boundary. Both wells are completed within the principal aquifer; however, the depth to the confining bed at the Palmdale well is greater than 1,000 feet-bls, while at Well 2A it is approximately 600 feet-bls.

The potential for ground-water contamination from surface or near surface sources at AF Plant 42 is, in general, low because of the thick sequence (approximately 300 feet) of unsaturated sediments which include discontinuous strata of clay and silt. Further, the low annual precipitation common to the area provides a low driving force for vertical contaminant migration.

There are two important exceptions which would significantly increase the potential for ground-water contamination at AF Plant 42. The first would be at those sites where

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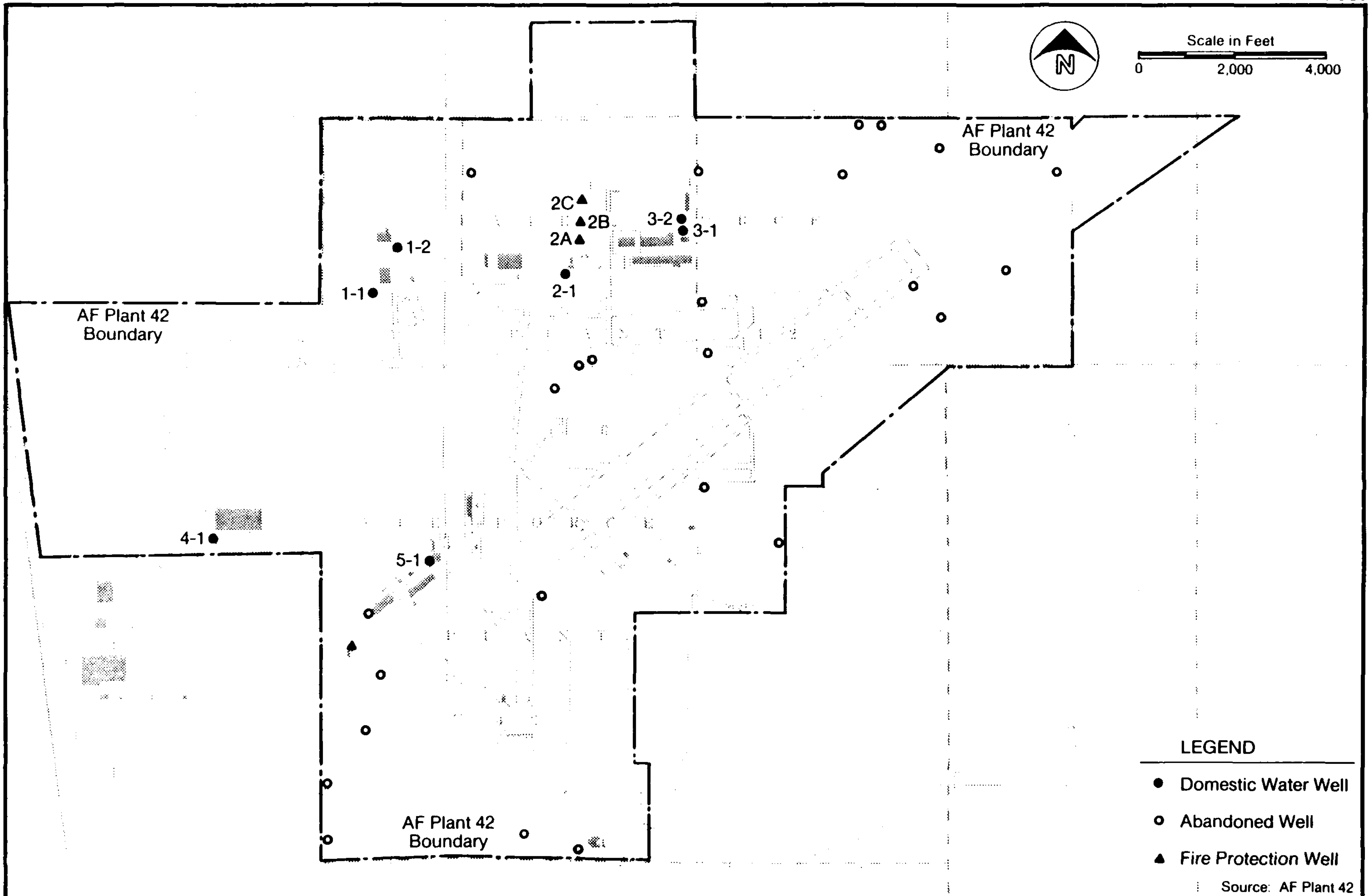

FIGURE 16.
Location Map of Water Wells at AF Plant 42.

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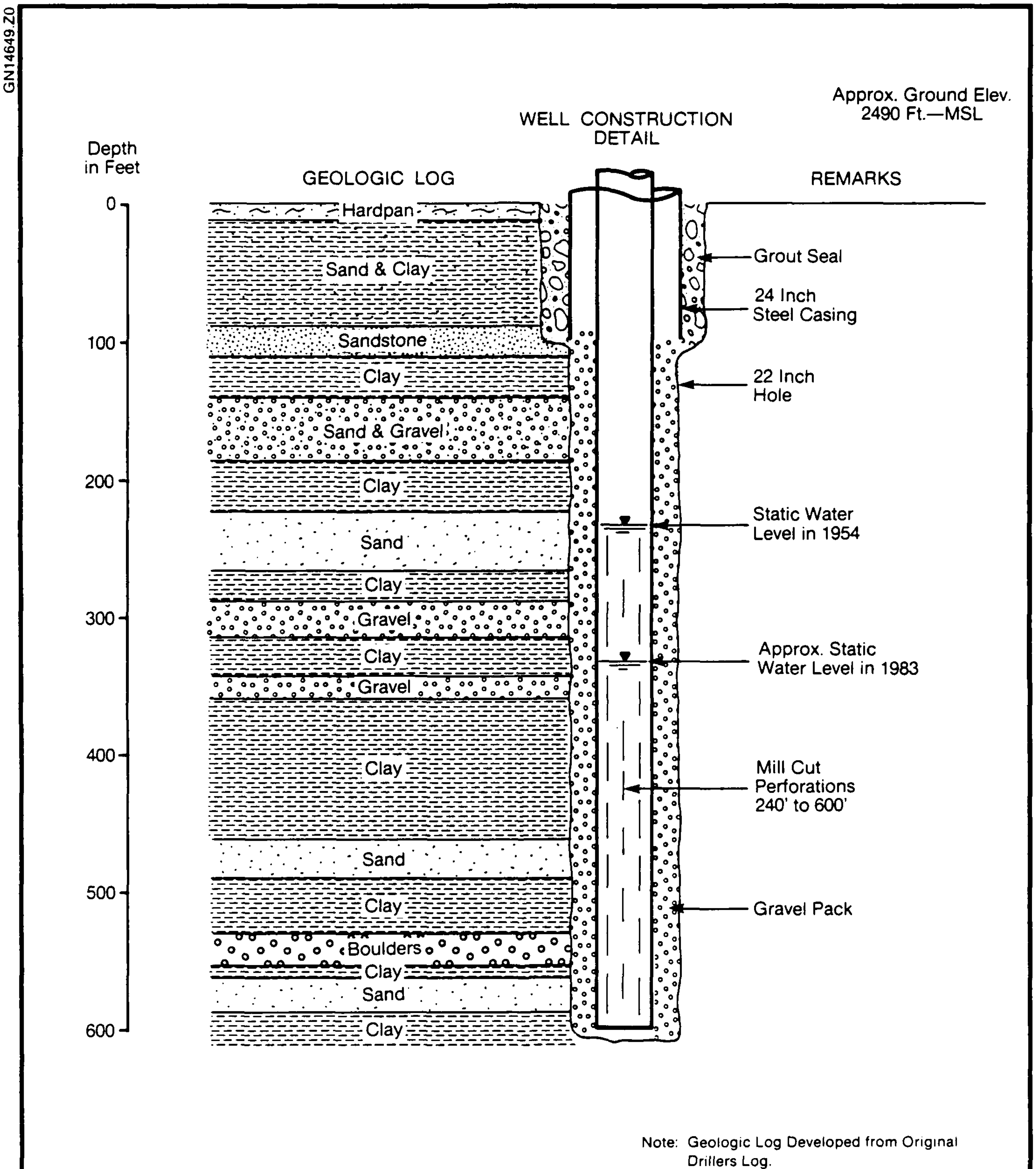


FIGURE 17.
Well Construction Detail and Geologic Log for Well 2A.

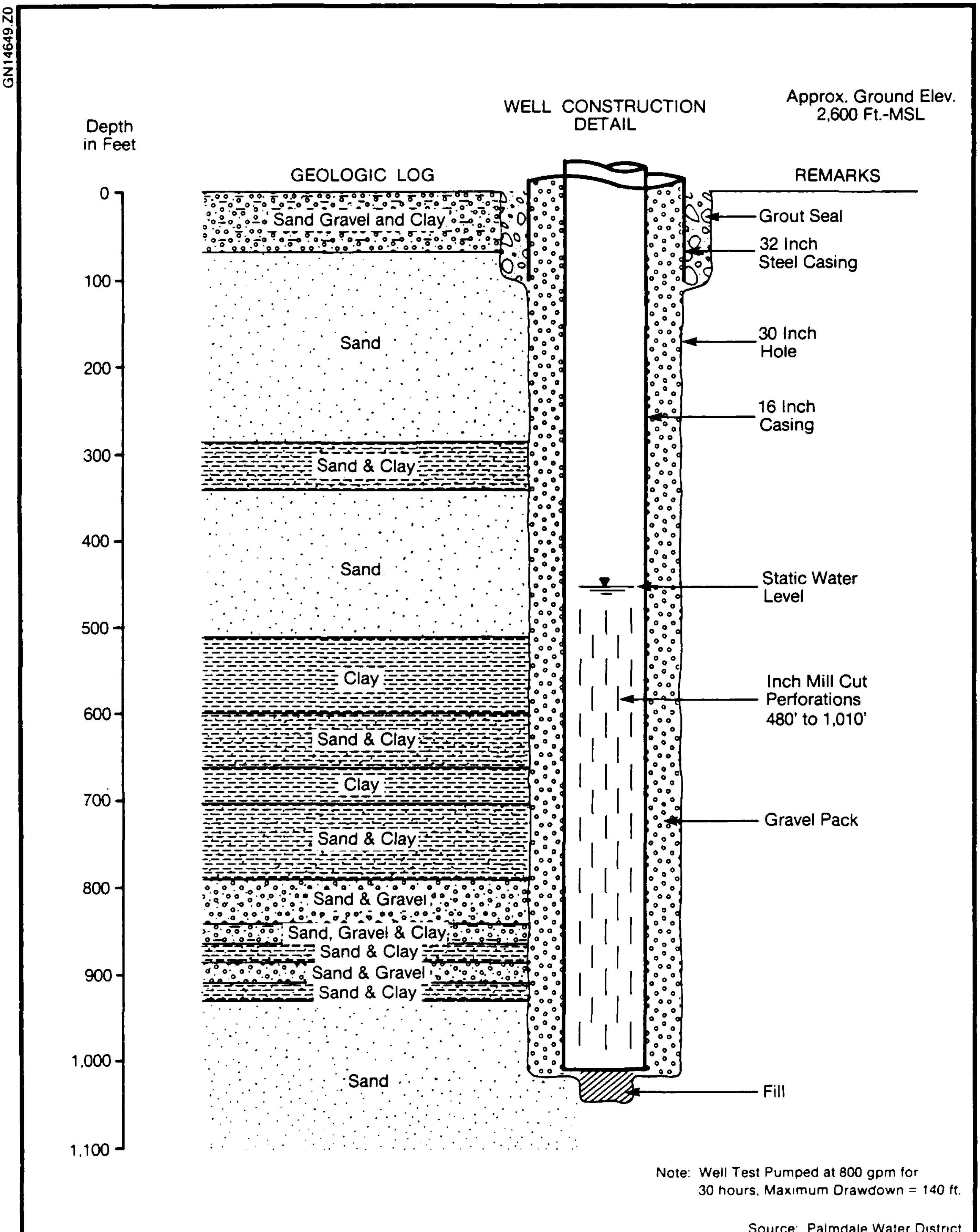


FIGURE 18.
Well Construction Detail and Geologic Log from Recently Constructed Well.

plant operations resulted in a continuous or near-continuous driving force. This would include areas such as ponds or lagoons which store liquid contaminants or drainage ditches or fire department training areas which regularly receive liquids containing contaminants. In those areas the driving force is present and would cause downward vertical migration which could reach the ground water.

The second exception would be at those sites which provide a direct pathway for contamination via abandoned or in-service water wells. Wells constructed many years ago, especially those installed for agricultural irrigation, were probably not sealed properly by today's standards. The annular space between casing and hole could provide a direct pathway from the surface to the ground water. Further, even a newly constructed well could provide a hydraulic connection from near the surface to the water table. Figure 18 depicts a recently constructed water well in which the outer casing is properly cemented (sealed) in place to a depth of 100 feet. With this method of construction, the well bore is sealed from land surface to a depth of 100 feet, assuming a good cementing job. From a depth of 100 feet to the total depth of the well, there is no cement seal and the gravel pack is in direct contact with the unconsolidated, unsaturated sediments. The potential for migration, although low to moderate, occurs where a contaminant placed on the surface moves vertically downward through the upper 100 feet of sediments and then laterally towards the well, reaching the gravel pack. This movement would be slow since the permeabilities of the upper 100 feet of unsaturated sediments are low to moderate. The occurrence of a continuous driving force as discussed above would increase the rate of movement. Once the contaminant reached the gravel pack, it would move vertically at a relatively rapid rate to the water table.

Review of Figure 16 illustrates that there are a significant number of abandoned irrigation wells at the plant. Some, located close to sites identified during this study, could potentially be direct pathways to the water table.

D. ECOLOGY

1. Flora and Fauna

The vegetative communities of the Antelope Valley region are composed chiefly of thornbushes and perennial shrubs, with sparse annual grasses and rapidly growing herbaceous plants. They are grouped in elementary associations with one or two dominant forms, or in mixed stands with several dominants. Other trees, plants, and ephemerals occur in pockets of higher moisture, in transitional areas, and in arroyos and drainage courses.

While the present vegetation at AF Plant 42 is considerably disturbed, compared to the historic natural vegetation, four general plant communities can be distinguished upon the site (Martin, 1976). Open stands of Joshua tree (*Yucca brevifolia*) woodland predominate in the western and northwestern portion of the site with desert scrub species in the understory. Desert scrub and desert pavement communities are common onsite. Desert scrub species include creosote bush (*Larrea tridentata*), Mormon tea (*Ephedra* spp.), wolfberry (*Lycium* spp.), rabbit-brush (*Chrysothamnus nauseosus*), and saltbush (*Atriplex* spp.). Better developed desert scrub communities also contain horse-brush (*Tietradymia* spp.), winter fat (*Eurotia lanata*), hop-sage (*Grayia spinosa*), and burro-brush (*Hymenoclea salsola*). Desert pavement communities have less shrubby

growth and are characterized by species such as crane's bill (Erodium cicutarium) and forget-me-nots (Cryptantha spp.). Depauperate grasslands predominate the southern portion of the site and in close proximity to the runways with cheat grass (Bromus tectorum) and California fescue (Festuca dertonensis) being the primary species.

The desert wildlife community contains a variety of mammals (mostly rodents), birds, reptiles, and amphibians. No wildlife surveys were conducted on AF Plant 42; however, expected mammal species include the desert kangaroo rat (Dipodomys deserti), California ground squirrel (Citellus beecheyi), Audubon's cottontail (Sylvilagus audubonii), black-tailed jackrabbit (Lepus californicus), and coyote (Canis latrans). Although many birds pass through the area during seasonal migrations, resident desert birds are limited to species such as Say's phoebe (Sayornis saya), the raven (Corvus corax), roadrunner (Geococcyx californianus), horned lark (Eremophila alpestris), California quail (Lophortyx californicus), pinyon jay (Gymnorhinus cyanocephala), cactus wren (Camphylorhynchus brunneicapillum), verdin (Auriparus flaviceps), black-tailed gnatcatcher (Policoptila melanura), and thrashers (Toxostoma spp.). The most common reptiles include alligator lizard (Gerrhonofus multicarinatus), keel-backed lizard (Dipsosaurus dorsalis), gridiron-tailed lizard (Callisaurus ventralis), zebra-tailed lizard (C. draconoides), desert whiptailed lizard (Cnemidophorus tigria), western box turtle (Terrapene ornata), and rattlesnakes (Crotalus spp.). Amphibians are limited to a few species, with the western toad (Bufo boreas) and Pacific treefrog (Heyla regila) being most common.

2. Threatened and Endangered Species

An extensive floristic survey of AF Plant 42 by Martin (1976) failed to discover any Federally listed endangered or listed threatened plant species. Similarly, surveys by A. D. Little, Inc. (1978) of endangered or threatened wildlife in the Palmdale International Airport area (which includes AF Plant 42) did not indicate the presence of Federally listed threatened or endangered species on the Air Force property or immediately adjoining lands.

IV. FINDINGS

A. ACTIVITY REVIEW

1. Summary of Industrial Waste Disposal Practices

The majority of industrial operations at AF Plant 42 have been in existence since 1954. The installation was initially constructed as an U.S. Army Air Corps base in 1940 and was later operated as the Los Angeles County Airport from 1946 to 1952. The major industrial operations have been related to the final assembly, flight acceptance testing, and maintenance and modification of jet aircraft. The major industrial operations include paint shops, major assembly facilities, subassembly facilities, final assembly and check-out facilities, aerospace ground equipment (AGE) maintenance shops, and vehicle maintenance shops. These industrial operations generate varying quantities of waste oils, recovered fuels, and spent solvents and cleaners.

The total quantity of waste oils, recovered fuels, and spent solvents and cleaners generated ranges from 100,000 to 125,000 gallons per year. This range of total waste quantities is based on current estimates. Waste quantities are dependent on contractor workload and may vary greatly from one time period to the next. Total waste quantities are believed to have been greater in the past, during periods of heavy contractor workload.

There are seven industrial areas designated at AF Plant 42 (see Figure 7, Section II.A). Only five areas, Sites No. 1, 2, 3, 5, and 7, are considered to have had significant industrial operations. The list of contractors which have operated these sites in the past is presented in Table 2, Section II.B. Site No. 4 has been primarily used

as a shipping, receiving, and storage warehouse. Site No. 6 has been operated as the Palmdale Airport Terminal.

Past (based on information obtained from files and on the best recollection of interviewees) and present industrial waste disposal practices are as follows:

a. Site No. 1

- 1954 to 1973: The majority of waste oils, recovered fuels, and spent solvents and cleaners were burned during fire department training exercises. Waste materials including engine oils, hydraulic fluids, fuels, cleaning solvents, paint residues, and paint thinners and strippers were collected in 55-gallon drums and 300-gallon bowsers and transported to the Fire Department Training Area (Site No. 7-2, Original Fire Department Training Area, from 1954 to 1959 and Site No. C-1, Abandoned Fire Department Training Area, from 1959 to 1973; identified disposal and spill sites are discussed in further detail in Section IV.B). Waste materials were poured into the training pit area and ignited for practice burns.

- 1973 to Present: Waste materials including engine oils, hydraulic fluids, paint thinners and strippers and isopropyl alcohol/silica gel wastes are collected in 55-gallon drums and transported off AF Plant 42 to the

Rockwell Downey Facility for final disposition.

b. Site No. 2

- 1954 to 1973: The majority of waste oils and recovered fuels and some spent solvents and cleaners were burned during fire department training exercises. The same procedures as described under Site No. 1 were followed. The majority of paint residues, paint thinners and strippers, and desealant solvents were washed down the floor drains in Building No. 211, through a concrete culvert, and into a ditch (Site No. 2-1, Paint Waste Disposal Ditch) located north of the building. During SR-71 aircraft refueling operations (initiated during 1964), routine small spills (25 to 50 gallons) of JP-7 were not recovered and were washed into the stormwater drainage ditch (Site No. 2-9, Fuel-Contaminated Ditch) located between Sites No. 2 and 3.

- 1973 to Present: Waste materials including engine oils, hydraulic fluids, and some paint thinners and strippers are collected in 55-gallon drums and transported off AF Plant 42 to Lockheed Burbank Facility for final disposition. In 1974, a 3,000-gallon underground (UG) collection sump was installed to collect paint residues, paint thinners and strippers, and desealant solvents

generated in Building No. 211. These waste materials are pumped out and removed off AF Plant 42 by a contractor. JP-7 spills resulting from SR-71 aircraft refueling operations continued to be washed into the stormwater drainage ditch until 1981. In 1981, a 5,000-gallon Herculon-lined catch basin was installed and was later replaced by a 5,000-gallon UG collection tank, to collect the JP-7 and washdown water. The recovered JP-7 and washdown water are pumped out and removed off AF Plant 42 by a contractor. Recovered JP-7 generated by the Fuel Flow Test Facility (Building No. 214) is also collected in an aboveground (AG) tank which is pumped out; the contents are removed off AF Plant 42 by a contractor. Current contractor removal is executed by a California State licensed hazardous waste transporter.

c. <u>Site No. 3</u>

- o <u>1954 to 1973</u>: The majority of waste oils and recovered fuels and some spent solvents and cleaners were burned during fire department training exercises. The same procedures as described under Site No. 1 were followed. The majority of paint residues, thinners, and strippers were washed down the floor drains in Building No. 305 to one of two UG collection sumps (one sump for each paint spray booth). Paint solids

settled out in the baffled sump and the overflow was discharged to the Wastewater Treatment Plant (WWTP) for further treatment. Two ion exchange treatment systems were installed at the collection sumps in 1968 for chromium removal, and the effluent was discharged to the WWTP. The acidic wastewater generated during deionized water production was neutralized and discharged to the WWTP. From 1963 to 1967, wastewater from the batch nickel plating operations conducted in Building No. 307 was placed in evaporation ponds (Site No. 3-2). After evaporation, the sludge was removed from the shallow ponds and sent off AF Plant 42 for recovery.

- 1973 to Present: Waste materials, including engine oils, cutting oils, and spent solvents, are collected in 55-gallon drums and removed off AF Plant 42 by a contractor. Through June 1983, paint residues and paint thinners and strippers were treated for chromium removal prior to discharge to the WWTP. These waste materials are now pumped out of the UG collection sump by a contractor and the contents transported off AF Plant 42. The acidic wastewater generated during deionized water production is neutralized and discharged to the WWTP.

d. Site No. 5

- 1954 to 1973: The majority of waste oils, recovered fuels, and spent solvents and cleaners were burned during fire department training exercises. The same procedures as described under Site No. 1 were followed.

- 1973 to Present: Waste materials, including engine oils, recovered fuels, spent solvents and cleaners, and solvent-soaked rags are collected in 55-gallon drums. From 1973 to 1980, waste materials generated by Northrop operations were transported off AF Plant 42 by a contractor. From the end of 1980 to present, the waste materials generated by Northrop operations have been transported off AF Plant 42 to Northrop Hawthorne Facility for final disposition. Some recovered fuels generated at the Fuel Systems Repair Shop (Building No. 459) are collected in a 3,000-gallon AG tank which is pumped out; the contents are removed off AF Plant 42 by a contractor. Waste materials generated by Lockheed operations (1979 to present) are transported off AF Plant 42 to Lockheed Burbank Facility for final disposition.

e. Site No. 7

- 1954 to 1973: The majority of waste oils, recovered fuels, and spent

solvents and cleaners were burned during fire department training exercises. The same procedures as described under Site No. 1 were followed. Some waste oils generated by the Vehicle Maintenance Shop (Building No. 531) were placed in a 550-gallon UG waste oil tank which was pumped out by a contractor; the contents were transported off AF Plant 42. Waste battery acids (sulfuric acid) were also placed in a 400-gallon UG waste tank, which was pumped out by a contractor; the contents were transported off AF Plant 42.

- <u>1973 to Present</u>: Waste materials, including engine oils, hydraulic fluids, recovered fuels, paint residues, and paint thinners and strippers, are collected in 55-gallon drums and removed off AF Plant 42 by a contractor. Waste oils were placed in the 550-gallon UG waste oil tank until July 1983 (time of site visit), at which time the tank was found to be leaking (Site 7-1, Vehicle Washrack and Leaking Underground Tank). Waste battery acids were placed in a separate 400-gallon UG waste tank which was pumped out by a contractor and removed off AF Plant 42 until late 1982. The lead acid batteries are no longer drained prior to being sold for recovery.

2. Industrial Operations

The industrial operations at AF Plant 42 have been primarily involved in the final assembly, flight acceptance testing, and maintenance and modification of jet aircraft. A list of representative aircraft is shown in Table 2, Section II.B. Appendix E contains a master list of the industrial operations.

A review of installation records and interviews with installation employees resulted in the identification of the industrial operations in which the majority of industrial chemicals are handled and hazardous wastes are generated. Table 6 summarizes the major industrial operations and includes the current estimated quantities of wastes generated as well as the past and present disposal practices of these wastes, i.e., treatment, storage, and disposal. Information on estimated waste quantities and past disposal practices is based upon information obtained from files and interviews with shop personnel based upon their best recollection. It is important to note that waste quantities are dependent on contractor workload and may vary significantly between time periods. Descriptions of the major industrial activities conducted by the current contractors are included in the following paragraphs.

a. Rockwell Space (Site No. 1)

Rockwell Space operates the majority of Site No. 1 and has been at this location since 1973. Building No. 295 at Site No. 1 is operated by Rockwell Aircraft, and a small portion of Site No. 1 (referred to as Site No. 1-A) is leased by Lockheed Air Services. Other contractors which have been located at Site No. 1 include Rockwell Aircraft (1954 to 1958) and Lockheed (1958 to 1973). Rockwell Space operations center around the final assembly of the space

Table 6
MAJOR INDUSTRIAL OPERATIONS SUMMARY

Contractor/Shop Name	Present Location (Bldg. No.)	Waste Material	Current Estimated Waste Quantity	Treatment/Storage/Disposal Methods 1950 1960 1970 1980
Rockwell Space (Site No. 1)				
Densification Shop	743	Isopropyl Alcohol/Silica Gel Waste	350 gal/yr	Rockwell Downey Facility[a]
Shuttle Assembly	294	Hydraulic Fluid	1,200 gal/yr	Rockwell Downey Facility[a]
		Methylethyl Ketone (MEK) and Trichloroethane Rags	50 drums/yr	Rockwell Downey Facility[a]
Calibration Lab	294	Hydraulic Fluid Alcohol Freon	150 gal/yr	Rockwell Downey Facility[a]
Maintenance Paint Booth	Outside, North of 295	Lacquer Thinner Paint Stripper	300 gal/yr 200 gal/yr	Rockwell Downey Facility[a]
Lockheed (Sites No. 2 and 5)				
General Maintenance Shop	210	Hydraulic Fluid	100 gal/yr	Fire Dept. Training; Lockheed Burbank Facility[a]

——— = Time frame confirmed by shop personnel.

-------- = Time frame assumed by shop personnel.

[a]Waste materials transported off AF Plant 42.

Table 6--Continued

Contractor/Shop Name	Present Location (Bldg. No.)	Waste Material	Current Estimated Waste Quantity	Treatment/Storage/Disposal Methods (1950 – 1960 – 1970 – 1980)
Lockheed (Sites No. 2 and 5--Continued)				
Paint Shop (Site No. 2)	211	Paint Strippers Desealant Solvent Paint Thinners Paint Residue Washdown Water	36,000 gal/yr	Paint Waste Disposal Ditch; Contractor Removal[a]
AGE/Vehicle Maintenance Shop	212	Hydraulic Fluid Engine Oil	100 gal/yr 200 gal/yr	Fire Dept. Training; Lockheed Burbank Facility[a]
Fuel Flow Test Facility	214	JP-7	48,000 gal/yr	Contractor Removal[a]
Paint Shop (Site No. 5)	427	Paint Stripper Paint Thinner Paint Residue	1,200 gal/yr	Fire Dept. Training; Contractor Removal[a]; Lockheed Burbank Facility[a]
Rockwell Aircraft (Sites No. 3, 4, and 1)				
Deionized Water Production	North of 305	Acidic Wastewater	Undetermined	Neutralization to Sanitary Sewer
Paint Booths	305	Paint Residue Paint Thinner Washdown Water	12,000 gal/yr	Sanitary Sewer; Chromium Removal to Sanitary Sewer; Contractor Removal[a]
Transportation Shop	308	Engine Oil	300 gal/yr	Fire Dept. Training; Contractor Removal[a]

——— = Time frame confirmed by shop personnel.

-------- = Time frame assumed by shop personnel.

[a]Waste materials transported off AF Plant 42.

Table 6--Continued

Contractor/Shop Name	Present Location (Bldg. No.)	Waste Material	Current Estimated Waste Quantity	Treatment/Storage/Disposal Methods (1950–1980)
Northrop (Site No. 5)				
Canopy and Windshield Shop	410	Alodine DOW-19	100 gal/yr 100 gal/yr	Fire Dept. Training; Northrop Hawthorne Facility[a]
Assembly Facility --Major Assembly --Sub Assembly --Final Assembly and Checkout	421	MEK Isopropyl Alcohol Acetone	500 gal/yr	Fire Dept. Training; Northrop Hawthorne Facility[a]
		MEK Rags	20 drums/yr	Offsite Solid Waste Removal; Northrop Hawthorne Facility[a]
Engine Shop	421	Engine Oil JP-4	100 gal/yr 100 gal/yr	Fire Dept. Training; Northrop Hawthorne Facility[a]
Safety Operations	401	Engine Oil	1,000 gal/yr	Fire Dept. Training; Northrop Hawthorne Facility[a]
Nero and Associates and Past Service Contractors[b] (Site No. 7)				
Vehicle Maintenance Shop	531	Engine Oil Hydraulic Fluid	1,200 gal/yr	Contractor Removal[a]
Battery Shop	531	Sulfuric Acid	400 gal/yr	Contractor Removal[a]

——— = Time frame confirmed by shop personnel.

-------- = Time frame assumed by shop personnel.

[a]Waste materials transported off AF Plant 42.

[b]Refer to Table 2, Section II.B for list of past service contractors.

shuttle. All wastes generated by Rockwell Space are collected in 55-gallon drums and are transported to Rockwell Downey Facility for final disposition. Descriptions of the major industrial activities are included in the following paragraphs.

i. Densification Shop

The Densification Shop is located in Building No. 743 and has only been in operation since 1979. The shuttle Thermal Protection System (TPS) tiles first receive an initial coating and waterproofing in the Coating Shop. The Densification Shop then increases the density of intermoline surface of the TPS tiles. A surface coating of borosilicate slurry (thinned with isopropyl alcohol), silane (a waterproofing agent), and teos (tetraethoxy-silane) is then brushed onto the intermoline surface of the TPS tiles. The TPS tiles are then dried and re-waterproofed with acetic acid (surface preparation) and silane. Waste materials include primarily outdated surface coatings (one-hour lifetime) which generate an isopropyl alcohol/silica gel waste (350 gal/yr).

ii. Shuttle Assembly

Shuttle assembly operations are conducted in Building No. 294. The TPS tiles are placed on the shuttle. This activity generates 50 55-gallon drums of solvent-soaked rags per year during wipedown with MEK and 1-1-1 trichloroethane. The testing and cleaning of component parts and the semiannual major maintenance of support equipment generates waste hydraulic fluid (1,200 gal/yr).

iii. Calibration Lab

The Calibration Lab is located in Building No. 294. Support equipment is checked, flushed, and calibrated, generating a waste of commingled hydraulic fluid, alcohol, and Freon (150 gal/yr).

iv. Maintenance Paint Booth

The Maintenance Paint Booth is located outside, between Buildings No. 294 and 295. Miscellaneous items such as signs, drums, and office furniture are painted in the paint booth. Wastes generated include lacquer thinner (300 gal/yr) and paint stripper (200 gal/yr).

b. Lockheed (Sites No. 2 and 5)

Lockheed operates Site No. 2 and has been at this location since 1964. Lockheed also leases four buildings at Site No. 5 (1979 to present, referred to as Site No. 5A) and utilizes part of Site No. 4 for fuel unloading operations. Other contractors which have been located at Site No. 2 include Northrop (1953 to 1958), Douglas (1958 to 1962), and Rockwell Aircraft (1962 to 1964). Lockheed operations at Sites No. 2 and 5A are primarily involved with the maintenance of SR-71 and U-2 aircraft and the assembly and maintenance of TR-1 aircraft. The major industrial activities are described in the following paragraphs:

i. General Maintenance Shop

The General Maintenance Shop is located in Building No. 210. The responsibility of this shop is to rebuild and maintain AGE and to conduct general facility maintenance. The primary waste generated is hydraulic fluid (100 gal/yr). Since 1973, the hydraulic fluid has been

collected in 55-gallon drums and transported off AF Plant 42 to Lockheed Burbank Facility for final disposition. Prior to 1973, the waste was burned during fire department training exercises.

ii. Paint Shop (Site No. 2)

The Paint Shop is located in Building No. 211. Activities include major desealing of SR-71 aircraft fuel tanks, paint stripping, surface preparation, and painting. The major industrial chemicals used include MEK, methyl isobutyl ketone (MIBK), Cee Bee, and Turco. Since 1974, paint residues, paint thinners and strippers, and desealant solvents have been washed down the floor drains to a 3,000-gallon UG collection sump. These waste materials (36,000 gal/yr including washdown water) are pumped out of the collection sump on the average of once a month and removed off AF Plant 42 by a contractor. Current contractor removal is executed by a California State licensed hazardous waste transporter. Prior to the construction of the collection sump in 1974, these waste materials were washed down the floor drains, through a concrete culvert, and into a ditch (Site No. 2-1, Paint Waste Disposal Ditch) located north of the building.

iii. AGE/Vehicle Maintenance Shop

The AGE/Vehicle Maintenance Shop is located in Building No. 212. Activities include the repair and maintenance of light-duty vehicles and the maintenance of AGE hydraulic systems. Wastes generated include hydraulic fluid (100 gal/yr) and engine oil (200 gal/yr). Since 1973, these wastes have been collected in 55-gallon drums and transported off AF Plant 42 to Lockheed Burbank Facility for final disposition. Prior to 1973, these wastes were burned during fire department training exercises.

iv. Fuel Flow Test Facility

The Fuel Flow Test Facility is located in Building No. 214. Activities include the inspection of SR-71 aircraft fuel lines, testing for in-flight fuel flow rates, and testing fuel dump capabilities. These activities combined generate approximately 8,000 gallons of JP-7 per aircraft test. Six SR-71 aircraft per year are fuel flow tested at this facility. Since this facility began operations in 1964, the recovered fuels have been discharged through a floor drain to a 2,000-gallon AG tank located in the stormwater drainage ditch between Sites No. 2 and 3. When full, the 2,000-gallon AG tank is pumped out and the fuels are transferred to a 5,000-gallon fuel truck. Fuels are then transported off AF Plant 42 by a California State licensed hazardous waste transporter to a recycling facility.

v. Paint Shop (Site No. 5)

The Paint Shop is located in building No. 427. Activities include the application of a primer coat to aircraft parts and the painting of AGE. Zinc chromate primer is primarily used during priming of aircraft parts. Waste generated consists of paint residues and paint strippers and thinners (1,200 gal/yr). Since 1979, these wastes have been collected in 55-gallon drums and transported off AF Plant 42 to Lockheed Burbank Facility for final disposition. Prior to 1979, this facility was operated by a different contractor. From 1973 to 1979, Paint Shop wastes were collected in 55-gallon drums and removed off AF Plant 42 by a contractor. Prior to 1973, Paint Shop wastes were burned during fire department training exercises.

c. Rockwell Aircraft (Sites No. 3, 4, and 1)

Rockwell Aircraft operates Site No. 3 and has operated this site from 1971 to present and from 1961 to 1967. Rockwell Aircraft also operates Site No. 4 (February 1983 to present) and Building No. 295 at Site No. 1. Other contractors which have been located at Site No. 3 include Convair (1954 to 1961), Northrop (1958 to 1963), and Douglas (1959 to 1961 and 1967 to 1971). During the period from 1961 to 1967, Rockwell Aircraft activities were primarily involved in the Research, Development, Testing, and Evaluation (RDTE) program for the XB-70 aircraft. From 1971 to 1977, activities centered around the RDTE program for the B-1A bomber. The B-1A bomber program was cancelled in July 1977. The facility remained in the dormant storage phase from 1978 to June 1982, and the only activities conducted were related to facility upkeep. Since June 1982, operations have been centered around gearing up for the final assembly of the B-1B bomber. During this transition period, only limited industrial activities have been conducted in the assembly facilities. The current major industrial activities are described in the following paragraphs:

i. Deionized Water Production

Deionized Water Production facilities are located outside of Building No. 305 along the north wall of the building. The deionized water is utilized for humidity control and evaporative cooling in the air circulation system which services Building No. 305 aircraft paint spray booths. Raw water supplied by an onsite well is treated by an ion exchange resin unit. An acidic wastewater is produced during the automatic regeneration of the ion exchange resins with hydrochloric acid. The acidic wastewater is neutralized with commercial caustic prior to being discharged to the AF Plant 42 WWTP.

ii. Paint Booths

Two wet wall paint spray booths are located in Building No. 305. Northrop leases one of the paint booths from Rockwell Aircraft and conducts large component part and aircraft painting operations. The other paint booth is used by Rockwell Aircraft and has not seen much activity in recent years. Paint residues and paint thinners and strippers are washed down the floor drains to one of two UG collection sumps (one sump for each paint booth). Paint solids are settled out in the baffled sump. Since June 1983, the paint wastes have been pumped out of the collection sump by a contractor and transported off AF Plant 42 for final disposition. The waste quantity generated is approximately 12,000 gal/yr (including washdown water); however, this quantity varies significantly depending on workload and has been significantly higher during times of peak production. From 1968 to 1982, the supernatant from the collection sump was pumped to a 3,000-gallon tank for storage until treatment. The paint booth wastewater was then treated for chromium removal on a batch basis by one of two ion exchange treatment units (one for each paint booth). The effluent from these treatment units was discharged to the WWTP. Prior to the installation of the ion exchange units in 1968, the overflow from the collection sumps was discharged to the WWTP. The sludge which accumulates in the collection sumps has been periodically (approximately once every 6 months) pumped out by a contractor and transported off AF Plant 42. No information was available regarding waste sludge generation quantities. The recirculating water in the wet wall paint booth which collects airborne paint particles was also periodically (every 4 to 6 months) purged to the collection sumps.

iii. Transportation Shop

The Transportation Shop is located in Building No. 308. The predominant waste generated during the repair and maintenance of vehicles is engine oil (300 gal/yr). Since 1973, the engine oil has been collected in 55-gallon drums and removed off AF Plant 42 by a contractor. Prior to 1973, the engine oil was burned during fire department training exercises.

d. Northrop (Site No. 5)

Northrop operates the majority of Site No. 5 and has been the primary tenant at this location since 1973. Lockheed leases the remaining facilities, consisting of four buildings at Site No. 5 (1979 to present, referred to as Site No. 5A). Other contractor operations which have been located at Site No. 5 include Lockheed (primary tenant 1952 to 1972), Convair (1955 to 1957), Northrop (1963 to 1973), and Douglas (1970 to 1979). Northrop operations center around the final assembly of military aircraft and include tail, wing, and fuselage final assembly. Operations vary depending upon contract type and workload. Recent activities have involved the final production of F-5, T-38, and F-20 aircraft. From 1973 to 1980, the majority of wastes generated by Northrop have been collected in 55-gallon drums and transported off AF Plant 42 by a contractor. From the end of 1980 to present, the waste materials have been transported off AF Plant 42 to Northrop Hawthorne Facility for final disposition. Prior to 1973, the majority of wastes were burned during fire department training exercises. The major industrial activities are described in the following paragraphs:

i. Canopy and Windshield Shop

The Canopy and Windshield Shop is located in Building No. 410. Activities include solvent wipedown and cleaning of aircraft windshields. Wastes generated include Alodine (100 gal/yr) and DOW-19 (100 gal/yr).

ii. Assembly Facility

The Assembly Facility, located in Building No. 421, includes the major assembly, sub-assembly, and final assembly, and checkout areas. Activities include the assembly of forward, center, and aft fuselages, mating, wing and tail assembly, systems installations, and electrical checkout. Small-scale stripping and surface preparation activities are also performed. Wastes generated include MEK, isopropyl alcohol, and acetone (500 gal/yr) and MEK-soaked rags (20 drums/yr).

iii. Engine Shop

The Engine Shop is located in Building No. 421. Wastes generated during engine modification, draining, and component replacement include engine oil (100 gal/yr) and JP-4 (100 gal/yr).

iv. Safety Operations

Safety Operations are conducted in Building No. 401. Activities include preflight safety testing, minor engine maintenance associated with final assembly, and aircraft preparation for delivery. The predominant waste generated is engine oil (1,000 gal/yr).

v. Other Activities

Northrop leases, from Rockwell Aircraft, a wet wall paint spray booth located in Building No. 305 at Site No. 3. Northrop conducts large component part and aircraft painting operations at the leased paint booth. A more detailed discussion of the paint booth operations is presented in Section IV.A.2.c.

Some conversion coating/surface preparation operations occur in Building No. 305 on a contract basis. The latest operation, conducted during 1982, involved the large-scale coating of approximately 50 aircraft by direct application of Alodine 1201, a commercial mixture of chromic and other acids. The Alodine 1201 was washed down with water and collected in floor drains which had been plugged to prevent discharge. The collected wastes were pumped into 55-gallon drums (approximately 60) and stored until transported off AF Plant 42 for final disposition.

e. Nero and Associates and Past Service Contractors (Site No. 7)

Nero and Associates operates the majority of Site No. 7 and has been the AF Plant 42 service contractor since 1981. There have been seven different service contractors since the activation of AF Plant 42 (refer to Table 2, Section II.B). The major responsibilities of the service contractor have remained unchanged and include: operation and maintenance of the WWTP; maintenance of the sanitary sewer system; general maintenance of AF Plant 42 common areas, runways, taxiways, roads, and drainage ditches; common security services; fire protection services; and pesticide application. Fire department training exercises, pesticides, and wastewater treatment are discussed later in

this section. The major industrial activities are described in the following paragraphs:

i. Vehicle Maintenance Shop

The Vehicle Maintenance Shop is located in Building No. 531. Activities include repair and maintenance of light-duty and heavy-duty vehicles. Wastes generated include engine oil and hydraulic fluid (1,200 gal/yr). Vehicles and engines are steam cleaned at the vehicle washrack located on the east side of Building No. 531. Dirt and oils removed during steam cleaning are washed into an adjacent drainage ditch located to the east. Prior to July 1983, waste engine oils, hydraulic fluids, and small quantities of parts cleaning solvents were placed in a 550-gallon UG waste oil tank located adjacent to the vehicle washrack. Wastes were either manually transported to the UG waste oil tank and poured into the filler pipe or poured into a drain inside Building No. 531 which discharged to the UG tank. Small spills have resulted during transfer operations. When full, the contents of the UG waste oil tank were pumped out and removed off AF Plant 42 by a contractor. During the site visit, the UG waste oil tank was discovered to be leaking and the tank was placed out of commission (Site No. 7-1, Vehicle Washrack and Leaking Underground Tank).

ii. Battery Shop

The Battery Shop is also located in Building No. 531. The only waste generated during the servicing of lead acid batteries was waste battery acid (sulfuric acid, 400 gal/yr). Prior to late 1982, the battery acid was drained into a 400-gallon UG waste tank located to the east of Building No. 531. The contents of the UG waste tank were pumped out and removed off AF

Plant 42 by a contractor. The lead acid batteries are no longer drained prior to being sold for recovery.

3. Fuels

The major aircraft fuel storage areas at AF Plant 42 are located at Sites No. 1, 2, 3, and 5. These areas are used for storage of JP-4, JP-5, JP-7, and JPTS (thermally stable). Site No. 1 houses one 5,000-gallon tank, two 25,000-gallon tanks, and one 50,000-gallon tank. Site No. 2 houses one 4,000-gallon tank, one 12,000-gallon tank, one 15,000-gallon tank, and two 50,000-gallon tanks. Site No. 3 houses two 20,000-gallon tanks and one 25,000-gallon tank. Site No. 5 houses one 19,000-gallon tank, one 20,000-gallon tank and three 25,000-gallon tanks. There are numerous other tanks at AF Plant 42 which are used for storage of MOGAS, AVGAS, diesel fuel, and heating fuel oil. A complete inventory of the major existing POL storage tanks is included in Appendix F.

Bulk fuels for Site No. 2 are transported into AF Plant 42 by railcar and are distributed to Site No. 2 by truck. The transfer area for loading the fuel onto the tank trucks from the railcars is located at Site No. 4. Numerous residual fuel spills resulting from connecting and disconnecting fuel lines were reported in this area (Site No. 4-1, Fuel Transfer Area) during the interviews. This is discussed further on page IV-45. Bulk fuels for the remaining sites are delivered by truck.

Records indicate that the majority of the major aircraft fuel storage tanks listed above were inspected and cleaned during one of the last two cleaning operations (March 1979 and July 1983). Fuel storage tanks are cleaned out by a contractor. Fuel tank sludge generated during

cleaning operations is removed off AF Plant 42 by the contractor.

Thirteen water-fuel phase separation systems are installed on the bulk storage tanks at Sites No. 1, 2, 3, and 5. These separation systems collect fuel condensate, which is generally a mixture of water and a small amount of fuel. From 1954 to 1980, the collected condensate was periodically discharged into a gravel-filled pit (eight pits, approximately 15 feet deep) or to the local ground surface at locations where a pit did not exist. It was estimated that less than 150 gallons of fuel were discharged into these pits over the 26-year period in which they were used. Because these areas were used for disposal of a relatively small quantity of fuel with little or no hydraulic driving force available, they were not considered hazardous waste disposal sites. Since 1981, the fuel-water condensate has been collected in buckets which are later poured into 55-gallon drums for disposal off AF Plant 42.

Several inactive storage tanks have been identified at AF Plant 42. There are four abandoned tanks located at Site No. 2, one of which has a 3,000-gallon capacity and was used for storage of diesel fuel. Three of these tanks have 15,000-gallon capacities and were used for storage of boiler fuel. These tanks were filled with sand when they were deactivated. Two other underground tanks located at Site No. 3 were deactivated and filled with sand according to interviews.

The U.S. Army Air Corps installed some POL tanks in the late 1940's which have since been abandoned. At Site No. 6 there is one 25,000-gallon tank and, in the common area, there are two abandoned 25,000-gallon tanks. No information was available about the deactivation of these tanks.

4. Fire Department Training Exercises

Fire department training activities have been conducted at AF Plant 42 since 1954. Based on information obtained during the interviews, three locations have been used for these activities: (1) the Original Fire Department Training Area (Site No. 7-2), (2) the Abandoned Fire Department Training Area (Site No. C-1), and (3) the New Fire Department Training Area (Site No. C-2). Past and present fire department training activities at AF Plant 42 are as follows:

- 1954 to 1959--Recovered fuels, waste engine oils and hydraulic fluids, and spent solvents and cleaners were brought from AF Plant 42 shops to the Original Fire Department Training Area (Site No. 7-2) in 55-gallon drums and 300-gallon bowsers. Dry cleaning compounds from local City of Palmdale dry cleaners were also brought to the site. During normal operations, fire department training activities were conducted on a weekly basis. Three burns were conducted at each exercise with a total of approximately 1,100 gallons of commingled waste being consumed. During larger fire department training activities, as much as 6,000 gallons of commingled wastes were consumed. Normally, wastes were poured into the fire department training area immediately before the fire was started; however, in some cases, wastes were dumped into the training area the night before the fire department training exercises were to be conducted.

- 1959 to 1981--Fire department training activities were moved from the Original Fire Department Training Area (Site No. 7-2) to the Abandoned Fire

Department Training Area (Site No. C-1) in 1959. From 1959 to 1973, commingled recovered fuels, waste engine oils and hydraulic fluids, and spent solvents and cleaners were either brought to the area by the contractors at each of the industrial sites or collected by the fire department. Fire department training activities were conducted six times each quarter. The fire department training area was presaturated with water before any waste materials were poured into the pit area. Approximately 500 to 800 gallons of waste were used during each exercise.

In 1973, the frequency of fire department training activities remained unchanged, but the recovered fuels, waste oils and hydraulic fluids, and spent solvents and cleaners normally used in fire department training activities were replaced by clean JP-4. Also, only 300 to 500 gallons of clean JP-4 were used during each activity. The practice of presaturating the area with water prior to each activity continued. In 1974, the fire department began using Aqueous Film-Forming Foam (AFFF) during fire department training activities.

- <u>1981 to Present</u>--Fire department training activities were moved from the Abandoned Fire Department Training Area (Site No. C-1) to the New Fire Department Training Area (Site No. C-2) in 1981. Fire department training activities are still conducted approximately six times per quarter using 300 to 500 gallons of clean JP-4 per activity obtained from a 5,000-gallon tanker truck located at the site. Due to recent construction and regrading (1983) of the New Fire Department

Training Area, training exercises are not currently being conducted at this site.

5. Polychlorinated Biphenyls (PCBs)

Typical sources of PCB at AF Plant 42 are electrical transformers and capacitors. There are currently 22 in-service PCB transformers at AF Plant 42. The distribution of PCB transformers, which are located at Sites No. 1, 2, 3, 5, and 5A, is as follows:

Site No.	No. of PCB Transformers	Total Capacity (gal)
1	2	1,240
2	2	920
3	10	3,691
5	6	2,175
5A	2	794

There are no out-of-service transformers stored on the installation. Transformers being replaced are removed from service by a contractor and taken off AF Plant 42 for proper disposition.

There were no reports or evidence of any major PCB spills from leaking or blown transformers.

6. Pesticides

Pesticides have commonly been used at AF Plant 42. The installation service contractor (Nero and Associates) controls the use and handling of all pesticides at Site No. 7 and in the joint use areas. The remaining sites individually contract out pesticide management.

Information was not available on the quantities of major insecticides currently used. The primary herbicide used is Roundup (120 gal/yr).

The application of pesticides generates empty pesticide containers containing pesticide residues. All empty pesticide containers were reported to be triple rinsed prior to contractor removal. The rinsate is collected and reused. Interviewees reported that in the past, empty pesticide containers had been disposed of in the landfill (Site No. C-3).

There were no reports of banned or restricted pesticides currently used on the installation or of any pesticide-related spills.

7. Wastewater Treatment

Sanitary sewage from AF Plant 42 is discharged to the WWTP operated by Nero and Associates, Inc. The WWTP consists of two 70,000-gallon primary clarifiers, four 3.2-acre oxidation ponds, four 3.2-acre percolation ponds, one anaerobic digester, and four sludge drying beds.

The WWTP is presently being rehabilitated. As part of this work, the two primary clarifiers are being cleaned, inspected, and repaired. Primary sludge is normally digested prior to being discharged to the sludge drying beds; however, recently the digester's drain line has been plugged, making the digester inoperable. The clogged drain lines are presently being replaced, and the entire digester is being rehabilitated. Three of the four existing oxidation ponds are also being regraded and lined with asphalt.

The design flow for the WWTP is 0.7 millions gallons per day (mgd). Based on the interviews, the present average daily flow is approximately 0.13 mgd, which includes domestic wastewater, industrial wastewater, and washdown waters from AF Plant 42. The influent biochemical oxygen demand (BOD) is approximately 75 milligrams per liter

(mg/l). Because of the low flow and load to the facility, only one percolation pond is presently being used.

Based on May 1983 and June 1983 waste discharge reports, the 7-month mean effluent BOD is approximately 20 mg/l, the chemical oxygen demand (COD) approximately 85 mg/l, and the pH approximately 9.0. Quarterly volatile organic compound (VOC) reports, available for the first and second quarters of 1983, indicated no VOC concentrations above detectable limits.

8. Available Water Quality Data

Potable water for Sites No. 1, 2, 3, 4, and 5 is supplied by domestic water wells located at each of industrial sites. Potable water for Site No. 7 is supplied by the Palmdale Water District through a 6-inch water line. Potable water supplied by onsite domestic water wells is of good quality and receives no treatment prior to consumption. Typical water quality data (based on the average results from all onsite domestic water wells sampled in October 1982) are as follows: total dissolved solids, 164 mg/l; hardness, 73 mg/l as $CaCO_3$; fluoride, 0.003 mg/l; chloride, 3.5 mg/l; boron, 0.045 mg/l; and sulfate, 9.94 mg/l. The locations of AF Plant 42 domestic water wells are shown on Figure 16, Section III.C.

The storm drainage system at AF Plant 42 is composed of man-made ditches, natural drainageways, and storm sewers. Stormwater runoff is conveyed by these drainage ditches and storm sewers to a large east-west perimeter ditch located along the north plant boundary. The perimeter ditch terminates at the northeast corner of the installation, where stormwater evaporates and infiltrates into the ground. The storm drainage system is not monitored for water quality.

9. Other Activities

An explosive ordnance storage facility is located at AF Plant 42; however, there was no evidence of any past or present explosive ordnance disposal activities at AF Plant 42.

B. DISPOSAL AND SPILL SITES IDENTIFICATION AND EVALUATION

Interviews were conducted with installation personnel (Appendix C) to identify disposal and spill sites at AF Plant 42. A preliminary screening was performed on all of the identified sites based on the information obtained from the interviews and available records from the installation and outside agencies. Using the decision tree process described in the "Methodology" section, a determination was made whether a potential exists for hazardous material contamination in any of the identified sites. For those sites where hazardous material contamination was considered significant, a determination was made whether significant potential exists for contaminant migration from these sites. These sites were then rated using the U.S. Air Force Hazard Assessment Rating Methodology (HARM), which was developed jointly by the Air Force, CH2M HILL, and Engineering-Science for specific application to the Air Force Installation Restoration Program. The HARM system considers four aspects of the hazard posed by a specific site: (1) the receptors of the contamination, (2) the waste and its characteristics, (3) potential pathways for waste contaminant migration, and (4) any efforts to contain the contaminants. Each of these categories contains a number of rating factors that are used in the overall hazard rating. A more detailed description of the HARM system is included in Appendix G.

A total of 25 disposal and spill sites were identified at AF Plant 42. Of these, 24 were rated using the HARM rating system. A complete listing of all of the sites, indicating potential hazards, is given in Table 7. Copies of the completed rating forms are included in Appendix H, and a summary of the hazard ratings for the sites is presented in Table 8.

Descriptions of each site, including a brief discussion of the rating results and the most significant factors which contributed in the rating score, are presented below. Approximate locations of the sites are shown on Figure 19. Figure 20 presents approximate operating dates for identified landfills, fire department training areas, and continuous or intermittent spills.

- Site No. 1-1, Engine Run-Up Area (overall score 48), was used sporadically for disposal of fuels, engine oils, and hydraulic fluids. The site is now covered by a parking lot. Limited information on dates of operation or waste quantities was available during the site visit.

  The overall HARM rating for this site is 48. The receptors subscore is 69 because of the population within 1,000 feet of the site, the distance to the nearest well (600 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 40 because this area may have been used for disposal of a medium quantity of high hazard waste materials with a persistence factor of 0.8. The pathways subscore is 35, primarily because of the distance to the nearest surface water (500 feet).

Table 7
DISPOSAL AND SPILL SITE SUMMARY

Site No.	Site Description	Potential Hazard Contamination	Potential Hazard Migration	Rating
1-1	Engine Run-Up Area	Yes	Yes	Yes
2-1	Paint Waste Disposal Ditch	Yes	Yes	Yes
2-2	Paint Waste Disposal Area	Yes	Yes	Yes
2-3	Paint Waste Disposal Area	Yes	Yes	Yes
2-4	Abandoned Disposal Area	Yes	Yes	Yes
2-5	Disposal Area	Yes	Yes	Yes
2-6	Disposal Area	Yes	Yes	Yes
2-7	Engine Run-Up Area	Yes	Yes	Yes
2-8	Engine Build-Up Area	Yes	Yes	Yes
2-9	Fuel-Contaminated Ditch	Yes	Yes	Yes
2-10	Disposal Area	Yes	Yes	Yes
2-11	Noise Level Area	Yes	Yes	Yes
2-12	TEB Disposal Area	Yes	Yes	Yes
3-1	Engine Run-Up Area	Yes	Yes	Yes
3-2	Evaporation Ponds	Yes	Yes	Yes
4-1	Fuel Transfer Area	Yes	Yes	Yes
4-2	Drum Disposal Area	No	N/A	No
5-1	Engine Run-Up Area	Yes	Yes	Yes
5-2	Fuel Disposal Area	Yes	Yes	Yes
6-1	Engine Run-Up Area and Flightline	Yes	Yes	Yes
7-1	Vehicle Washrack and Leaking Underground Tank	Yes	Yes	Yes
7-2	Original Fire Department Training Area	Yes	Yes	Yes
C-1	Abandoned Fire Department Training Area	Yes	Yes	Yes
C-2	New Fire Department Training Area	Yes	Yes	Yes
C-3	Landfill	Yes	Yes	Yes

Note: N/A = Not applicable.

Table 8
SUMMARY OF DISPOSAL AND SPILL SITE RATINGS

Site No.	Site Description	Subscore (% of Maximum Possible Score in Each Category) Receptors	Characteristics	Pathways	Factor for Waste Management Practices	Overall Score	Page Reference of Site Rating Form
1-1	Engine Run-Up Area	69	40	35	1.0	48	H-1
2-1	Paint Waste Disposal Ditch	67	100	80	1.0	82	H-3
2-2	Paint Waste Disposal Area	69	50	35	1.0	51	H-5
2-3	Paint Waste Disposal Area	69	50	35	1.0	51	H-7
2-4	Abandoned Disposal Area	67	40	35	1.0	47	H-9
2-5	Disposal Area	69	40	35	1.0	48	H-11
2-6	Disposal Area	69	50	28	1.0	49	H-13
2-7	Engine Run-Up Area	67	64	35	1.0	55	H-15
2-8	Engine Build-Up Area	69	32	43	1.0	48	H-17
2-9	Fuel-Contaminated Ditch	67	80	100	1.0	82	H-19
2-10	Disposal Area	67	24	35	1.0	42	H-21
2-11	Noise Level Area	67	32	35	1.0	45	H-23
2-12	TEB Disposal Area	69	40	35	1.0	48	H-25
3-1	Engine Run-Up Area	67	40	35	1.0	47	H-27
3-2	Evaporation Ponds	69	40	35	1.0	48	H-29
4-1	Fuel Transfer Area	72	48	35	1.0	52	H-31
5-1	Engine Run-Up Area	69	64	80	1.0	71	H-33
5-2	Fuel Disposal Area	69	32	35	1.0	45	H-35
6-1	Engine Run-Up Area and Flightline	59	40	35	1.0	45	H-37
7-1	Vehicle Washrack and Leaking Underground Tank	59	48	80	1.0	62	H-39
7-2	Original Fire Department Training Area	59	80	35	1.0	58	H-41
C-1	Abandoned Fire Department Training Area	62	80	35	1.0	59	H-43
C-2	New Fire Department Training Area	62	48	35	1.0	48	H-45
C-3	Landfill	62	60	35	1.0	52	H-47

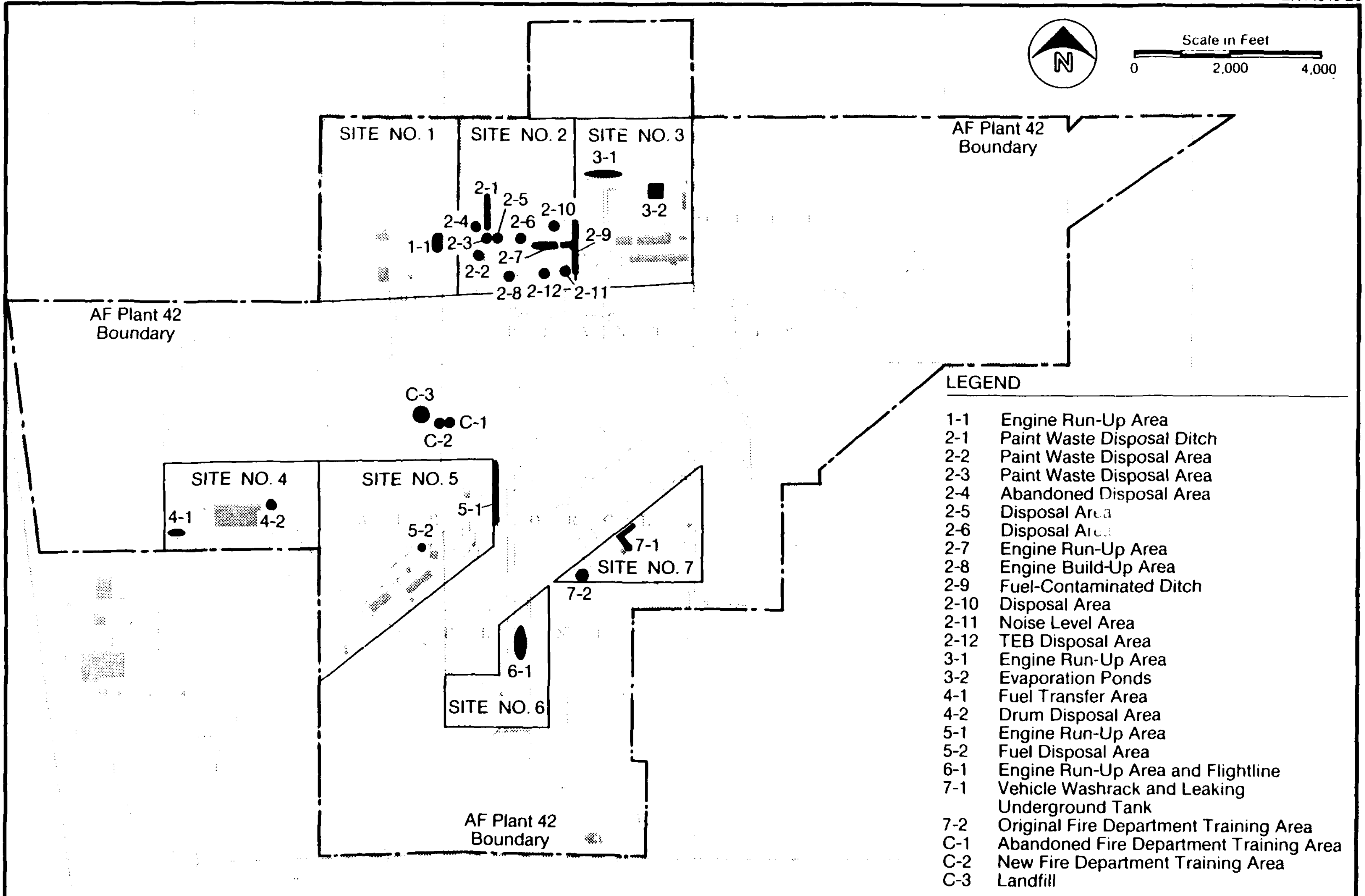


FIGURE 19.
Location Map of Identified Disposal and Spill Sites at AF Plant 42.

CH2M HILL

GN14649 Z0

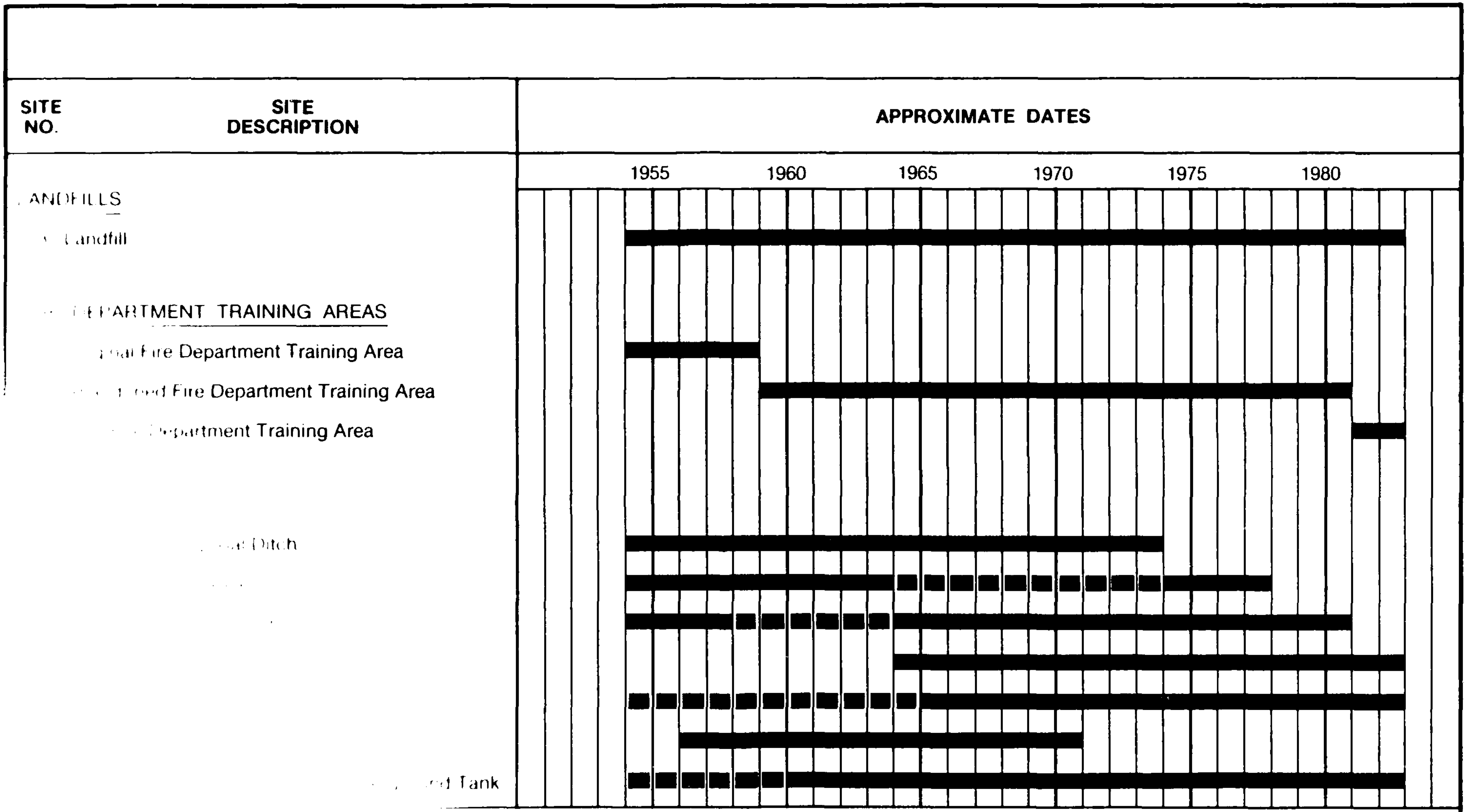


FIGURE 20.
mary of Activities at Major Disposal and Spill Sites at AF Plant 42.

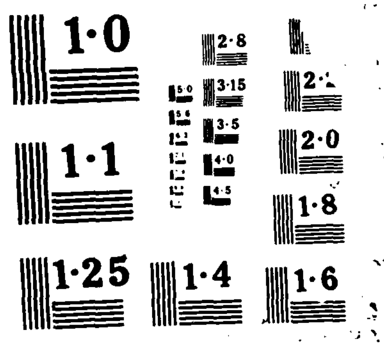
AD-A190 941 INSTALLATION RESTORATION PROGRAM RECORDS SEARCH FOR AIR FORCE PLANT 42 CALIFORNIA(U) CH2M HILL INC GAINESVILLE FL OCT 83 AFESC/DEV-42-IRP-002 F08637-80-G-0010-5003

2/3

UNCLASSIFIED

F/G 24/4

NL


1·0
2·8
3·15
3·5
2·0
1·1
4·0
4·5
1·8
1·25
1·4
1·6

- Site No. 2-1, Paint Waste Disposal Ditch (overall score 82), was used for disposal of Building No. 211's paint wastes from approximately 1954 to 1974. Once every 2 weeks during the period from 1954 to 1958, approximately 250 gallons of commingled Turco, toluene, MEK, and paint residues were rinsed down the floor drain with washwater (approximately 6 parts water to 1 part waste), out through a concrete culvert, and into a ditch approximately 100 yards north of the building. During the interviews, shop personnel reportedly assumed that this ditch was used from 1958 to 1972 for paint waste disposal with approximately the same quantities being generated. From 1972 to 1974, two U-2 aircraft per year were stripped and painted in Building No. 211. Approximately 150 to 200 gallons of the paint stripper, Cee Bee, were rinsed with washwater (approximately 6 parts water to 1 part waste) down the drain, out through the culvert, and into the ditch each time an aircraft was cleaned. After 1974, an UG collection sump was installed. Waste materials (approximately 3,000 gal/mo of rinsewater and waste) are now collected for disposal off AF Plant 42 by a local contractor. Current contractor removal is executed by a California State licensed hazardous waste transporter. During the site visit, the drainage ditch was inspected for contamination. The contaminated portion of the ditch was approximately 150 feet long and 4 feet wide. Bottom sediments in the ditch had a blackish discoloration and chemical odor, and the water in the ditch had an oily sheen.

  The overall HARM rating score for this site is 82. The receptors subscore is 67, primarily because of

the distance to the nearest well (800 feet), the water quality of the nearest surface-water body, and the population served by ground water within 3 miles of the site. The waste characteristics subscore is 100 because this area was used for disposal of a large quantity of high hazard paint strippers and residues. The pathways subscore is 80 because indirect evidence of contamination in the ditch was observed during the site visit.

- Site No. 2-2, Paint Waste Disposal Area (overall score 51), was used for disposal of paint residues and lacquer thinners generated while cleaning paint guns in Building No. 211 from 1954 to 1956. Approximately 20 gallons of commingled waste materials were disposed of each day in this area which is immediately west of the building. During the site visit dried paint residues and discolored soils were noted.

  The overall HARM rating score for this site is 51. The receptors subscore is 69, primarily because of the population within 1,000 feet of the site, the distance to the nearest well (1,700 feet), the water quality of the nearest surface-water body, and the population served by a ground-water supply within 3 miles of the site. The waste characteristics subscore is 50 because this area may have been used for disposal of a medium quantity of high hazard waste materials. The pathways subscore is 35, primarily because of the distance to the nearest surface water (300 feet).

- Site No. 2-3, Paint Waste Disposal Area (overall score 51), was used for disposal of lacquer thinners, MEK, toluene, and other paint residues

from 1954 to 1956. Approximately 25 gallons of commingled wastes were disposed of each day in this area, which is north of Building 211 at the fence line.

The overall HARM rating score for this site is 51. The receptors pathway is 69, primarily because of the population within 1,000 feet of the site, the distance to the nearest well (1,700 feet), the water quality of the nearest surface-water body, and the population served by ground water within 3 miles of the site. The waste characteristics subscore is 50 because this area may have been used for disposal of a medium quantity of high hazard waste materials. The pathways subscore is 35, primarily because of the distance to the nearest surface water (less than 100 feet).

- Site No. 2-4, Abandoned Disposal Area (overall score 47), is located adjacent to Site No. 2-1, the Paint Waste Disposal Ditch, approximately 100 yards north of Building No. 211. This site was used from 1954 to 1974 for disposal of concrete and asphalt rubble, asbestos blast fencing, wooden crates, rubber hoses, drums (both empty and partially full), galvanized siding, light poles, fencing, and miscellaneous metals. Some burning was conducted here from approximately 1968 to 1974. From 1979 to 1981, a cleanup campaign was conducted and several drums were removed for disposal off-site.

  The overall HARM rating score for this site is 47. The receptors subscore is 67, primarily because of the distance to the nearest well (1,600 feet), the water quality of the nearest surface-water body,

and the population served by ground water within 3 miles of the site. The waste characteristics subscore is 40 because this area may have been used for disposal of a small quantity of high hazard waste materials. The receptors subscore is 35, primarily because of the distance to the nearest surface-water body (less than 100 feet).

- Site No. 2-5, Disposal Area (overall score 48), was used sporadically for disposal of photochemicals from the photolab and detergent wastes from the fire department from approximately 1954 to 1958. This same area was used again from approximately 1965 to 1969 for disposal of spent solvents from the garage. No information on quantities was available.

  The overall HARM rating score for this site is 48. The receptors score is 69, primarily because of the population within 1,000 feet, the distance to the nearest well (1,700 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 40 because this area may have been used for disposal of a small quantity of high hazard waste materials. The receptors subscore is 35, primarily because of the distance to the nearest surface water (250 feet).

- Site No. 2-6, Disposal Area (overall score 49), was located adjacent to the back fence and was used periodically for disposal of recovered fuels, hydraulic fluids, engine oils, spent solvents, and paint strippers from approximately 1954 to 1981. No information on quantities was available during

the site visit. Some soil discoloration and dried paint chips were noted during the site visit.

The overall HARM rating score for this site is 49. The receptors score is 69, primarily because of the population within 1,000 feet, the distance to the nearest well (1,250 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 50, primarily because this area may have been used for disposal of a medium quantity of high hazard waste materials. The pathways subscore is 28, primarily because of the distance to the nearest surface water (750 feet).

- Site No. 2-7, Engine Run-up Area (overall score 47), was used sporadically for disposal of recovered fuels, engine oils, and hydraulic fluids from approximately 1954 to 1962. When Lockheed moved into the site in 1964, a fuel line was repaired which had been leaking JP-4. In 1978, the fuel line was replaced after JP-7 was found to be leaking in the same area. The total area of contamination is approximately 300 feet long and 5 feet wide.

  The overall HARM rating score for this site is 55. The receptors score is 67, primarily because of the distance to the nearest well (400 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 64 because this area was used for disposal of a medium quantity of high hazard waste materials with a persistence factor

of 0.8. The pathways subscore is 35, primarily because of the distance to the nearest surface water (less than 100 feet).

- Site No. 2-8, Engine Build-Up Area (overall score 48), was used from 1954 to 1957 to wash engine oils off of engines and drain hydraulic fluids into the ditch adjacent to the site. No information on quantities was available during the site visit.

  The overall HARM rating score is 48. The receptors subscore is 69, primarily because of the population within 1,000 feet of the site, the distance to the nearest well (1,200 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 32 because this area may have been used for disposal of a medium quantity of medium hazard waste materials with a persistence factor of 0.8. The pathways subscore is 43, primarily because of the distance to the nearest surface water (0 feet), a drainage ditch which is dry most of the year.

- Site No. 2-9, Fuel-Contaminated Ditch (overall score 82), was used from 1954 to 1958 for disposal of JP-4, engine oil, hydraulic fluids, and solvents. The ditch was used for monthly disposal of approximately 100 gallons of commingled wastes.

  From 1964 to 1981, during SR-71 aircraft refueling operations, approximately 25 to 50 gallons of JP-7 spilled from the fuel tank and was washed into a 200 foot long concrete swale which led into the

north-south stormwater drainage ditch between Sites No. 2 and No. 3. Some fuels washed over the concrete swale onto the local ground surface. This occurred approximately 25 times per year. In 1981, a 5,000-gallon Herculon-lined catch basin was installed to prevent further contamination of the ditch. When full, the catch basin was emptied by a contractor for disposal off AF Plant 42. In 1983, the Herculon-lined catch basin was replaced by a 5,000-gallon collection tank which is pumped out by a contractor on a monthly basis.

In May 1983, a 2,000-gallon AG tank, which is used to collect JP-7 generated by the Fuel Flow Test Facility, overflowed approximately 150 gallons of JP-7 into the ditch. The fuel-saturated soils were excavated and removed.

In July 1982, 12 soil borings, two of which were background borings, were conducted in the area of the Fuel-Contaminated Ditch. The soil borings were completed to depths ranging from 40 to 50 feet below land surface. Laboratory analyses revealed that jet fuels, primarily JP-7, JPTS, and JP-4 were found in all ten soil borings conducted in the contaminated area. Jet fuel was identified at maximum boring depths (40 to 50 feet) in eight of the borings. Cleanup and Abatement Order No. 83-1 was issued on January 11, 1983 by the California Regional Water Quality Control Board, Lahontan Region. A Draft Problem Exploration, Confirmation, and Quantification Presurvey Report has been completed at this site.

The contaminated areas of this site include the land immediately adjacent to the 200 foot long

concrete swale and approximately 1,500 lineal feet of the north-south stormwater drainage ditch.

The overall HARM rating score for this site is 82. The receptors subscore is 67, primarily because of the distance to the nearest well (125 feet), the water quality of the nearest surface-water body, and the population served by the ground water within 3 miles of the site. The waste characteristics subscore is 80 because this area was used for disposal of a large quantity of high hazard waste materials with a persistence factor of 0.8. The pathways subscore is 100 because there is direct evidence (confirmed by laboratory analysis) of soil contamination at the site.

- Site No. 2-10, Disposal Area (overall score 42), was used sporadically from 1954 to 1958 for disposal of waste oil from the F-89 Aircraft. Limited information on waste quantities was available.

  The overall HARM rating score for this site is 42. The receptors subscore is 67, primarily because of the distance to the nearest well (350 feet), water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 24 because this area may have been used for disposal of a small quantity of medium hazard waste materials with a persistence factor of 0.8. The pathways subscore is 35, primarily because of the distance to the nearest surface-water body (250 feet).

- Site No. 2-11, Noise Level Area (overall score 45), was used sporadically from 1954 to 1958 for disposal of fuels, engine oils, and hydraulic fluids, all of which were dumped onto the ground adjacent to the end of the ramp.

  The overall HARM rating for this site is 45. The receptors subscore is 67, primarily because of the distance to the nearest well (200 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 32, primarily because this area may have been used for disposal of a small quantity of high hazard waste materials with a persistence factor of 0.8. The pathways subscore is 35, primarily because of the distance to the nearest surface water (less than 100 feet).

- Site No. 2-12, TEB Disposal Area (overall score 48), has been used since 1964 for disposal of a mixture of triethyl borine (TEB) and hydraulic oil which were used to ignite JP-7 in the SR-71 aircraft. Unused or old mixtures of TEB and hydraulic oil can be either stable or pyrophoric depending on the mixture of the two materials. Approximately four times per year, this area is used for disposal of 5 gallons of commingled TEB and hydraulic oil. When the mixture ignites, most of the hydraulic oil and TEB are destroyed. Discolored soils were noted in the TEB disposal area during the site visit.

  The overall HARM rating for this site is 48. The receptors subscore is 69, primarily because of the population within 1,000 feet of the site, the

distance to the nearest well (700 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 40 because this area is used for disposal of a small quantity of medium hazard waste materials with a persistence factor of 0.8. The pathways subscore is 35, primarily because of the distance to the nearest surface water (0 feet), a drainage ditch which is dry most of the year.

- Site No. 3-1, Engine Run-Up Area (overall score 47), was used from 1957 to 1961 for disposal of 10 to 20 gallons per day (gpd) of fuels.

  The overall HARM rating for this site is 47. The receptors subscore is 67, primarily because of the distance to the nearest well (500 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 40, primarily because this area may have been used for disposal of a medium quantity of high hazard waste materials with a persistence factor of 0.8. The pathways subscore is 35, primarily because of the distance to the nearest surface water (300 feet).

- Site No. 3-2, Evaporation Ponds (overall score 48), was used from 1963 to 1967 to recover nickel from nickel plating wastewaters. Aircraft parts were nickel plated in a batch system, and spent nickel plating wastewater was hauled out to the plastic-lined evaporation ponds in trucks. The water was allowed to evaporate, and

crystallized nickel plating waste residues were collected and recycled.

The overall HARM rating for this site is 48. The receptors subscore is 69, primarily because of the population within 1,000 feet of the site, the distance to the nearest well (600 feet), the water quality of the nearest surface-water body, and the population served by ground water within 3 miles of the site. The waste characteristic subscore is 40 because this area may have been used for disposal of a small quantity of high hazard waste materials. The pathways subscore is 35, primarily because of the distance to the nearest surface water (200 feet).

- Site No. 4-1, Fuel Transfer Area (overall score 52), is used to transfer JP-7 from railcars to fuel trucks for distribution to Sites No. 1, 2, 3, and 5. Small quantities of fuels are reportedly spilled from the fuel hoses during the fuel transfer process. This area is presently being expanded and modified. Top soils have been disturbed during construction to the extent that no fuel-saturated areas, if such areas are present, could be observed during the site visit.

  The overall HARM rating for this site is 52. The receptors subscore is 72, primarily because of the population within 1,000 feet of the site, the distance to the nearest well (500 feet), the distance to the reservation boundary (300 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 48 because this

area was used for disposal of a small quantity of high hazard waste materials with a persistence factor of 0.8. The pathways subscore is 35 because of the distance to the nearest surface water (less than 100 feet).

- Site No. 4-2, Drum Disposal Area (not rated) was used for unauthorized disposal of three 55-gallon drums containing flammable liquids in July 1982. Immediately after the incident, the contaminated soil was excavated, placed in containers, and hauled offsite for disposal at an authorized landfill. Since there is no potential for contamination, the site was not rated.

- Site No. 5-1, Engine Run-Up Area (overall score 71), was used from 1956 to 1971 for daily disposal of approximately 20 gallons of commingled JP-4, engine oils, hydraulic fluids, and spent solvents. Archival photographs indicate extensive contamination in the ditch adjacent to the engine run-up area. Approximately 600 lineal feet of the ditch were noticeably contaminated in the photograph. During the site visit, semi-hardened material having a slight POL odor and discolored soils were noted at several places in the ditch.

  The overall HARM rating for this site is 71. The receptors subscore is 69, primarily because of the population within 1,000 feet of the site, the distance to the nearest well (1,600 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 64 because this area was used for disposal of a medium quantity of high

hazard waste materials with a persistence factor of 0.8. The pathways subscore is 80 because indirect evidence of contamination was found during the site visit.

- Site No. 5-2, Fuel Disposal Area (overall score 45), was used periodically for disposal of fuels. During the late 1950s the concrete pad, which is presently used for hazardous material storage, was used as a fuel flow test facility. Small quantities were reportedly disposed of adjacent to the pad. Information concerning disposal dates and quantities was not available during the site visit.

  The overall HARM rating for this site is 45. The receptors subscore is 69, primarily because of the population within 1,000 feet of the site, the distance to the nearest well (300 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 32, primarily because this area may have been used for disposal of a small quantity of high hazard waste materials with a persistence factor of 0.8. The pathways subscore is 35, primarily because of the distance to the nearest surface water (less than 100 feet).

- Site No. 6-1, Engine Run-Up (overall score 45), was used from 1955 to 1957 for daily disposal of approximately 10 to 20 gallons of fuels, engine oil, and hydraulic fluid.

  The overall HARM rating for this site is 45. The receptors subscore is 59, primarily because of the

water quality of the nearest surface-water body and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 40 because some of the fuel, estimated to be a medium quantity with a high hazard rating, may have leaked into the ground. The receptors subscore is 35, primarily because of the distance to the nearest surface water (800 feet).

- Site No. 7-1, Vehicle Washrack and Leaking Underground Tank (overall score 62), is adjacent to Building No. 531. Since 1954, engine dirt, oils, fuels, and detergents from the vehicle washrack have been washed into the adjacent drainage ditch. During the site visit, an UG waste oil tank adjacent to the vehicle washrack was found to be leaking and was placed out of commission. The UG waste oil tank received waste engine oils, hydraulic fluids, and small quantities of spent solvents from maintenance operations in Building No. 531. It was not possible to estimate the quantity of washrack wastewater or oil from the leaking tank. The drainage ditch, which collects washwater from the washrack, was inspected during the site visit. Oils, tar-like substances, discolored soils, and a distinct POL odor were noted along approximately 1,000 lineal feet of the ditch.

  The overall HARM rating for this site is 62. The receptors subscore is 59, primarily because of the water quality of the nearest surface water and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 48 because this area

was used for disposal of a medium quantity of medium hazard waste materials with a persistence factor of 0.8. The pathways subscore is 43, primarily because of the distance to the nearest surface water (less than 100 feet).

- Site No. 7-2, Original Fire Department Training Area (overall score 58), was used from 1954 to 1959 to conduct fire department training activities. Fuels, engine oils, hydraulic fluids, and solvents were brought to the area in 55-gallon drums and 300-gallon bowsers. Spent solvents from the City of Palmdale dry cleaners were also brought to the area. Approximately once each week, this area was used for disposal of 1,100 gallons of commingled wastes during fire department training exercises. In some cases, wastes were allowed to sit in the fire department training area overnight prior to burning. Most of the materials would have been consumed in the fires; however, some minor percolation into the ground is assumed to have occurred. This fire department training area was laid out in a circular pattern approximately 200 feet in diameter.

  The overall HARM rating for this site is 58. The receptors subscore is 59, primarily because of the water quality of the nearest surface-water body and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 80 because this area was used for disposal of a large quantity of high hazard waste materials with a persistence factor of 0.8. The pathways subscore is 35, primarily

because of the distance to the nearest surface water (400 feet).

- Site No. C-1, Abandoned Fire Department Training Area (overall score 59), was used for fire department training activities from 1959 to 1981. From 1959 to 1973, this area was used for disposal of 550 to 800 gallons of commingled fuels, engine oils, hydraulic fluids, and spent solvents during fire department training activities conducted six times per quarter. Waste materials were either collected by the fire department or brought to the fire department training area by the contractors at each site. After 1973, only 300 to 500 gallons of clean JP-4 were used for fire department training activities conducted approximately six times per quarter. Most of the materials would have been consumed in the fires; however, some minor percolation into the ground is assumed to have occurred. This fire department training area was laid out in a circular pattern approximately 200 feet in diameter.

  The overall HARM rating for this site is 59. The receptors subscore is 62, primarily because of the distance to the nearest well (2,800 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 80 because this area was used for disposal of a large quantity of high hazard waste materials with a persistence factor of 0.8. The pathways subscore is 35, primarily because of the distance to the nearest surface water (less than 100 feet).

- Site No. C-2, New Fire Department Training Area (overall score 48), was constructed in 1981. Approximately six times per quarter, 300 to 500 gallons of clean JP-4 are burned in fire department training activities. Due to recent construction and regrading of the area, training exercises have not been conducted at this site since early 1983.

  The overall HARM rating for this site is 48. The receptors subscore is 62, primarily because of the distance to the nearest well (2,800 feet), the water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 48 because this area is used for disposal of a small quantity of high hazard waste materials with a persistence factor of 0.8. The pathways subscore is 35, primarily because of the distance to the nearest surface water (less than 100 feet).

- Site No. C-3, Landfill (overall score 52), is adjacent to the abandoned and new fire department training areas and has been used for disposal of miscellaneous construction rubble since 1954. Materials found at the site include wood, asphalt, concrete, clay and metal pipe, cable and wire, paint chips, brush, empty drums, and rubber. This area was also reportedly used for disposal of some pesticide cans, paint thinners, kerosene, and lacquer thinners in small quantities.

  The overall HARM rating for this site is 52. The receptors subscore is 62, primarily because of the distance to the nearest well (2,800 feet), the

water quality of the nearest surface-water body, and the population served by the ground-water supply within 3 miles of the site. The waste characteristics subscore is 60 because this area was used for disposal of a small quantity of high hazard waste materials. The pathways subscore is 35 because of the distance to the nearest surface water (less than 100 feet).

C. ENVIRONMENTAL STRESS

During the July 1983 site visit, major known former or present disposal areas were examined for signs of vegetative stress possibly related to the presence or migration of hazardous wastes. No signs of stress were detected during this investigation.

V. CONCLUSIONS

A. Information obtained through interviews with 38 installation personnel, installation records, and field observations indicates that hazardous wastes have been disposed of on AF Plant 42 property in the past.

B. Direct evidence (confirmed by laboratory analyses) of contaminant migration exists for Site No. 2-9, Fuel-Contaminated Ditch.

C. Indirect evidence (confirmed by visual observation) of contamination exists at: Site No. 2-1, Paint Waste Disposal Ditch; Site No. 5-1, Engine Run-Up Area; and Site No. 7-1, Vehicle Washrack and Leaking Underground Tank.

D. No evidence of environmental stress due to past disposal of hazardous wastes was observed at AF Plant 42.

E. The potential for surface-water migration of hazardous contaminants is low. Due to the low annual precipitation rate, the high annual evapotranspiration rate, and percolation of stormwater runoff into the soil, the storm drainage system remains relatively dry most of the year.

F. The potential for ground-water migration of hazardous contaminants is low to moderate, due primarily to: (1) low annual precipitation rate (approximately 9 inches per year), (2) high annual evapotranspiration rate (approximately 74 inches per year), (3) depth to ground water (approximately 300 feet), and (4) low to moderate range of soil permeabilities (4.5×10^{-4} to 1.4×10^{-2} cm/sec). Although only low to moderate, the

potential does exist due to: (1) the absence of a continuous low-permeability confining stratum in the unsaturated zone, and (2) the presence of numerous abandoned wells which, if improperly sealed, may act as a direct pathway. The potential for contaminant migration is higher in areas where a hydraulic driving force may be present at times. Such areas include storm drainage ditches and fire department training areas.

G. Table 9 presents a priority listing of the rated sites and their overall scores. The following sites were designated as areas showing the most significant potential (relative to other AF Plant 42 sites) for environmental impact.

1. <u>Site No. 2-9--Fuel-Contaminated Ditch</u>

This storm drainage ditch received primarily aircraft fuels generated during aircraft refueling operations over approximately a 17-year period. During aircraft refueling operations, primarily JP-7 spilled onto the refueling pad and was washed via a concrete swale into the north-south storm drainage ditch located between Sites No. 2 and No. 3. Some fuels washed over the concrete swale onto the local ground surface. Direct evidence of contamination was confirmed by laboratory analyses which revealed jet fuels, primarily JP-7, JPTS, and JP-4, in soil boring samples collected in July 1982. Cleanup and Abatement Order No. 83-1 was issued on January 11, 1983 by the California Regional Water Quality Control Board, Lahontan Region. A Draft Problem Exploration, Confirmation

Table 9
PRIORITY LISTING OF DISPOSAL AND SPILL SITES

Site No.	Description	Overall Score
2-9	Fuel-Contaminated Ditch	82
2-1	Paint Waste Disposal Ditch	82
5-1	Engine Run-Up Area	71
7-1	Vehicle Washrack and Leaking Underground Tank	62
C-1	Abandoned Fire Department Training Area	59
7-2	Original Fire Department Training Area	58
2-7	Engine Run-Up Area	55
4-1	Fuel Transfer Area	52
C-3	Landfill	52
2-2	Paint Waste Disposal Area	51
2-3	Paint Waste Disposal Area	51
2-6	Disposal Area	49
1-1	Engine Run-Up Area	48
2-5	Disposal Area	48
2-8	Engine Build-Up Area	48
2-12	TEB Disposal Area	48
3-2	Evaporation Ponds	48
C-2	New Fire Department Training Area	48
2-4	Abandoned Disposal Area	47
3-1	Engine Run-UP Area	47
2-11	Noise Level Area	45
5-2	Fuel Disposal Area	45
6-1	Engine Run-Up Area and Flightline	45
2-10	Disposal Area	42

and Quantification Presurvey Report has been completed at this site.

2. Site No. 2-1--Paint Waste Disposal Ditch

This storm drainage ditch received paint residues, paint thinners and strippers, and desealant solvents generated during painting activities conducted in Building No. 211 over approximately a 20-year period. Paint wastes, including MEK, MIBK, toluene, Turco, and Cee Bee, were washed down the floor drains, through a concrete culvert, and into the ditch located to the north of Building No. 211. Indirect evidence of contamination observed during the site visit included discolored bottom sediments with a chemical odor and an oily sheen on the surface of the water in the ditch.

3. Site No. 5-1--Engine Run-Up Area

The storm drainage ditch located adjacent to the engine run-up area at Site No. 5 received wastes generated during routine aircraft maintenance activities conducted on the run-up apron. Wastes, including JP-4, engine oils, and hydraulic fluids, were dumped along the west side of the ditch over a 15-year period. Indirect evidence of contamination observed during the site visit included some discolored soils with a slight POL odor.

4. <u>Site No. 7-1--Vehicle Washrack and Leaking Underground Tank</u>

The storm drainage ditch located adjacent to the vehicle washrack at Building No. 531 receives engine dirt and oils generated during steam cleaning operations at the washrack. Materials are washed off the washrack into the ditch. In addition, small spills of engine oils, hydraulic fluids, and occasionally solvents have resulted during the transfer of these materials into the UG waste oil tank located adjacent to the vehicle washrack. During the site visit, the soil surrounding the UG waste oil tank was partially excavated and the tank was found to have leaks. Indirect evidence of contamination observed in the storm drainage ditch during the site visit included oils, discolored soils, and a distinct POL odor.

5. <u>Site No. C-1--Abandoned Fire Department Training Area</u>

Site No. C-1 was used for fire department training exercises over a 22-year period. From 1959 to 1973, the training area was used for the disposal of commingled fuels, engine oils, hydraulic fluids, and spent solvents. From 1973 to 1982, only clean JP-4 was burned during practice burns at the site. Most of the materials would have been consumed in the fires; however, some minor percolation into the ground is assumed to have occurred. The persistent components, such as chlorinated solvents and organic aromatic

components of fuel such as benzene and toluene, may be present below the ground surface.

6. Site No. 7-2--Original Fire Department Training Area

Site No. 7-2 was used for fire department training exercises over a 5-year period. The site was used for the disposal of fuels, engine oils, hydraulic fluids, and spent solvents. As discussed above, some minor percolation into the ground is assumed to have occurred, and persistent components may be present.

7. Site No. 2-7--Engine Run-Up Area

Site No. 2-7 was used sporadically for the disposal of recovered fuels, engine oils, and hydraulic fluids over an 8-year period. A leaking fuel line, which runs under this area, was repaired in 1964 after it was found to be leaking JP-4 and was later replaced in 1978 after JP-7 was found to be leaking in the same area.

H. The remaining sites (Sites No. 1-1, 2-2 through 2-6, 2-8, 2-10 through 2-12, 3-1, 3-2, 4-1, 5-2, 6-1, C-2, and C-3), as well as the site that was not rated, are not considered to present significant environmental concerns. In general, these sites exhibited low pathways and low waste characteristics subscores. The presence of a hydraulic driving force was also absent at most of these sites.

VI. RECOMMENDATIONS

A. PHASE II PROGRAM

A limited Phase II monitoring program is recommended to confirm or rule out the presence and/or migration of hazardous contaminants. The priority for monitoring at those sites which are high on the priority list (see Table 9) is considered moderate to high.

Tables 10 and 11 present a summary of recommended monitoring sites, parameters to be measured, and the rationale for the analyses, while Figure 21 presents the locations of the sites where sampling is recommended. Specifically, sampling is recommended for Site No. 2-9--Fuel-Contaminated Ditch, Site No. 2-1--Paint Waste Disposal Ditch, Site No. 5-1--Engine Run-Up Area, Site No. 7-1--Vehicle Washrack and Leaking Underground Tank, Site No. C-1--Abandoned Fire Department Training Area, Site No. 7-2--Original Fire Department Training Area, and Site No. 2-7--Engine Run-Up Area.

1. Site No. 2-9--Fuel-Contaminated Ditch

Results from soil sampling conducted at Site No. 2-9 in July 1982 revealed that jet fuels were found at depths up to 50 feet (maximum boring depths). Additional exploratory field work should be conducted to determine the maximum depth of contaminant migration. Approximately six to eight soil borings are recommended in the immediate vicinity of the fuel-contaminated area as shown on Figure 22. Soil borings should be completed to a depth of approximately 200 feet. A certified geologist should be present to examine the soil profile and characteristics and

Table 10
RECOMMENDED PHASE II ANALYSES

Sample Type	TOX[a] or VOC[b]	HEAVY METALS	PHENOLS	COD, TOC AND OIL AND GREASE
Soil Sampling				
Site No. 2-9--Fuel-Contaminated Ditch	X			X
Site No. 2-1--Paint Waste Disposal Ditch	X	X	X	X
Site No. 5-1--Engine Run-Up Area	X			X
Site No. 7-1--Vehicle Washrack and Leaking Underground Tank	X			X
Site No. C-1--Abandoned Fire Department Training Area	X	X	X	X
Site No. 7-2--Original Fire Department Training Area	X	X	X	X
Site No. 2-7--Engine Run-Up Area	X			X

[a] TOX -- Total Organic Halogens

[b] VOC -- Volatile Organic Compounds

Table 11
RATIONALE FOR RECOMMENDED ANALYSES

Parameter	Rationale
Total Organic Halogens (TOX) or Volatile Organic Compounds (VOC)	Organic solvents used onsite (past and present); persistent components of fuels and other POL products, e.g., benzene and toluene.
Heavy Metals (lead, chromium, and cadmium)	Potential sources identified (leaded fuel and paint wastes).
Phenols	Phenolic cleaners and paint strippers used in the past.
COD, TOC, and Oil and Grease	Fuel spill indicators and indicators of non-specific contamination.

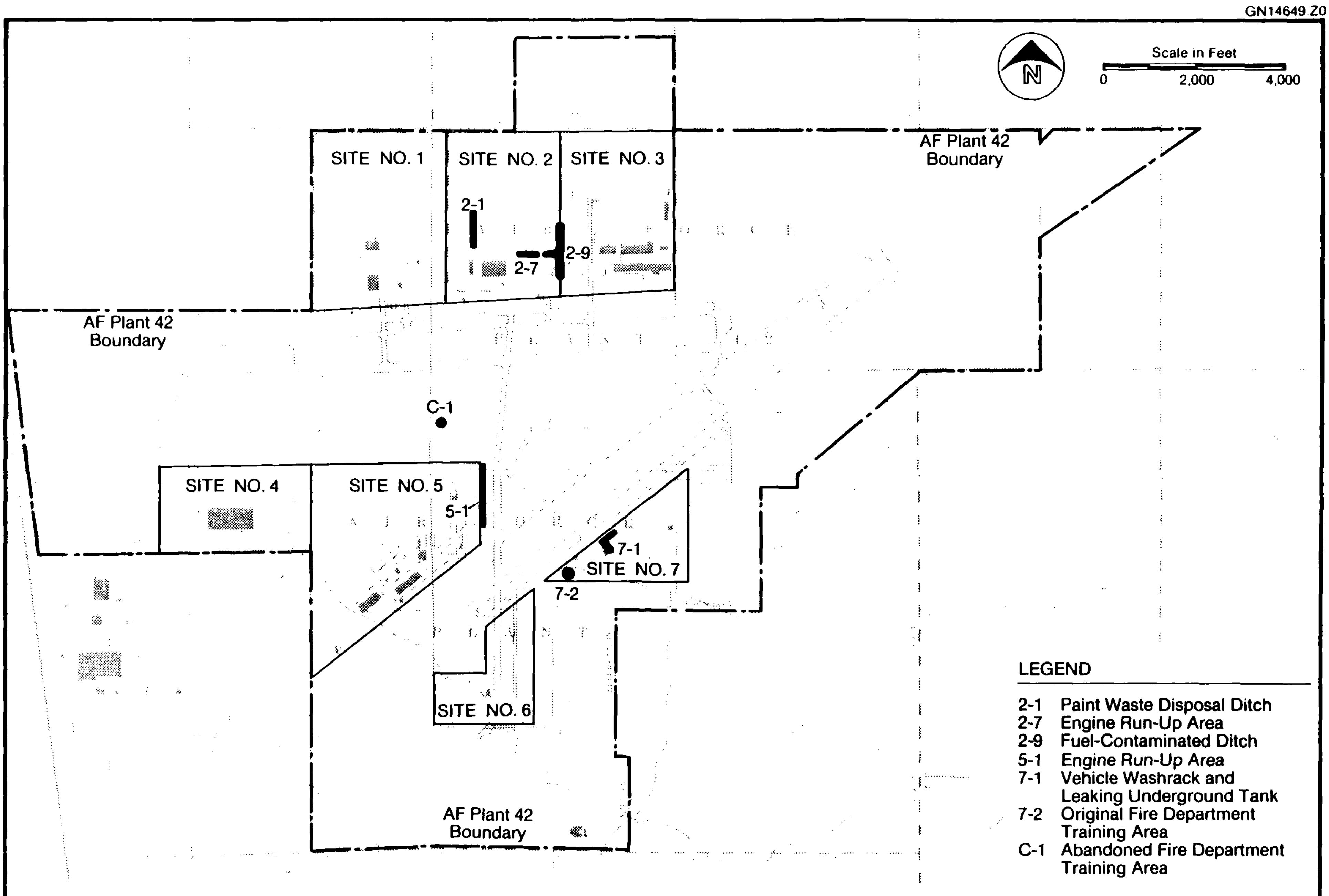


FIGURE 21.
Location Map of Sites Recommended for Limited Phase II Monitoring.

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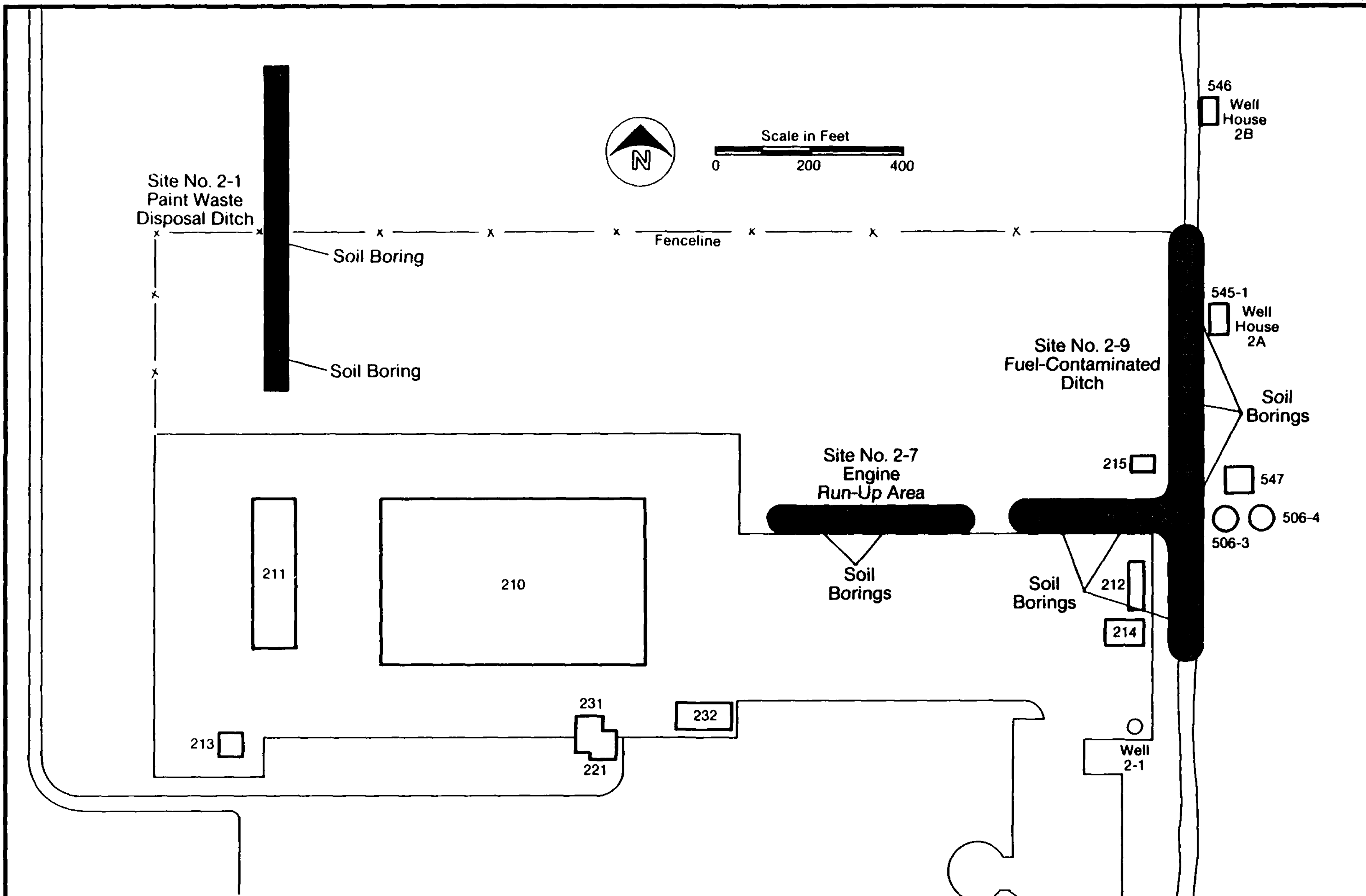

FIGURE 22.
Recommended Preliminary Sampling Locations for Site No. 2-1—Paint Waste Disposal Ditch, Site No. 2-7—Engine Run-Up Area, and Site No. 2-9— Fuel-Contaminated Ditch.

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to inspect for signs of contamination. Soil samples should be collected at approximately 10-foot intervals; however, the number of samples collected per boring should be at the discretion of the geologist. The soil samples should be collected and analyzed in accordance with Table 10. Based on the results of the recommended soil sampling, the need for additional Phase II confirmation and quantification work should be evaluated.

Soil borings are also recommended for the remaining six sites identified for limited Phase II monitoring. The soil borings should be completed to a depth of approximately 50 feet. In the event that contamination is confirmed at depths of 50 feet, additional soil borings should be completed to greater depths (approximately 200 feet) to determine the vertical extent of contaminant migration. A certified geologist should be present to examine the soil profile and characteristics and to inspect for signs of contamination. Soil samples should be collected and analyzed in accordance with Table 10. The number of samples collected per boring should be at the discretion of the geologist. After sampling has been completed, the soil borings should be properly sealed to prevent a pathway for contaminant migration. Specifically, soil borings should be collected as follows:

2. <u>Site No. 2-1--Paint Waste Disposal Ditch</u>

It is recommended that two soil borings be completed at this site at the approximate locations shown on Figure 22. Soil boring locations shown on Figure 22 are in the area of most significant hydraulic driving force. It should be noted that due to the steep gradient along the banks of the drainage ditch, modifications to the embankment may be necessary to allow for access to the site.

3. Site No. 5-1--Engine Run-Up Area

Three soil borings are recommended at this site at the approximate locations shown on Figure 23.

4. Site No. 7-1--Vehicle Washrack and Leaking Underground Tank

It is recommended that three soil borings be completed at this site at the approximate locations shown on Figure 24.

5. Site No. C-1--Abandoned Fire Department Training Area

One soil boring is recommended at this site at the approximate location shown on Figure 25.

6. Site No. 7-2--Original Fire Department Training Area

One soil boring is recommended at this site at the approximate location shown on Figure 24.

7. Site No. 2-7--Engine Run-Up Area

Two soil borings are recommended at this site at the approximate locations shown on Figure 22.

B. OTHER ENVIRONMENTAI .COMMENDATIONS

Other environmenta. recommendations that have resulted from the installation si e visit and records search include the following:

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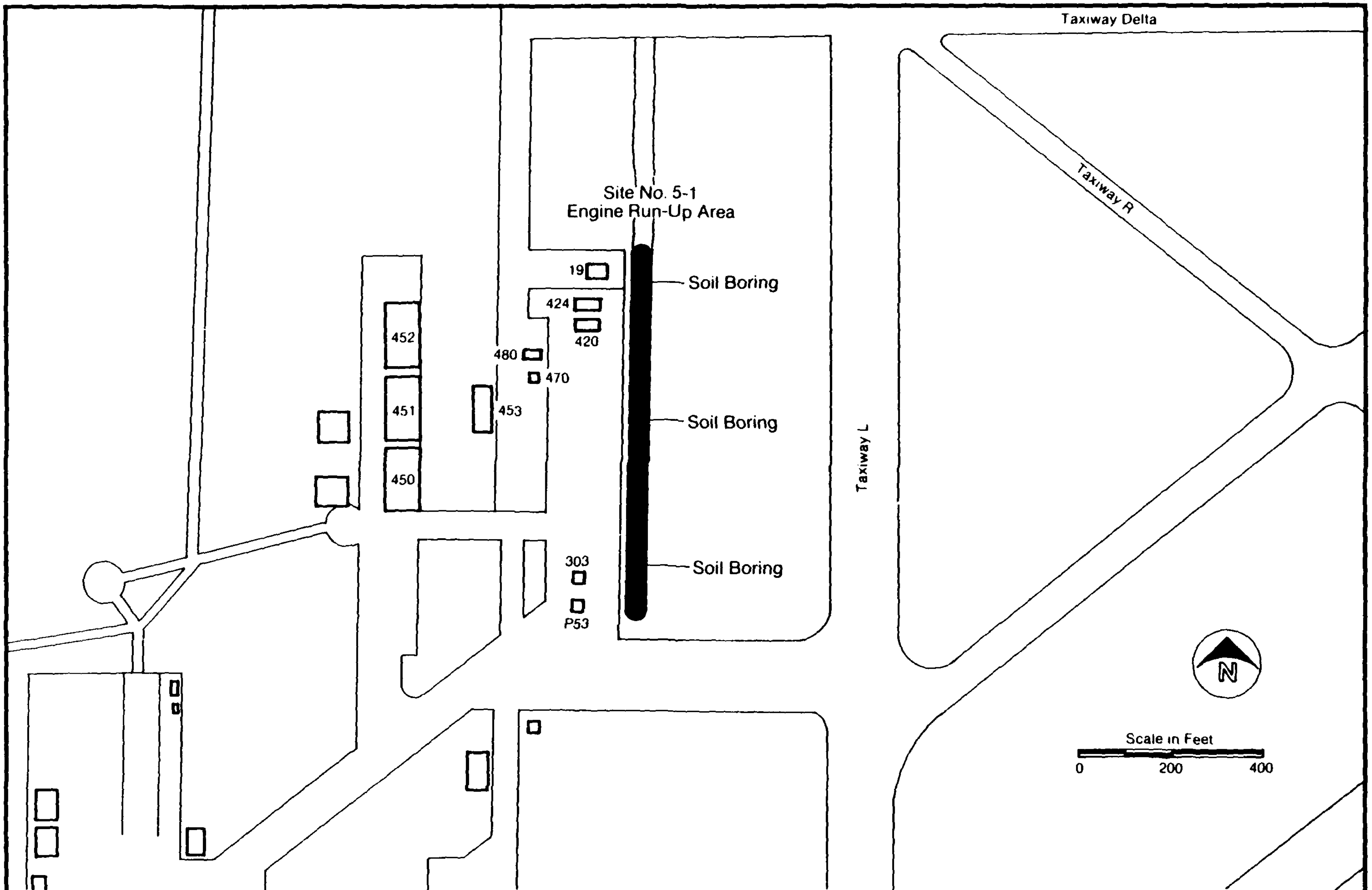

FIGURE 23.
Recommended Preliminary Sampling Locations for Site No. 5-1—
Engine Run-Up Area.

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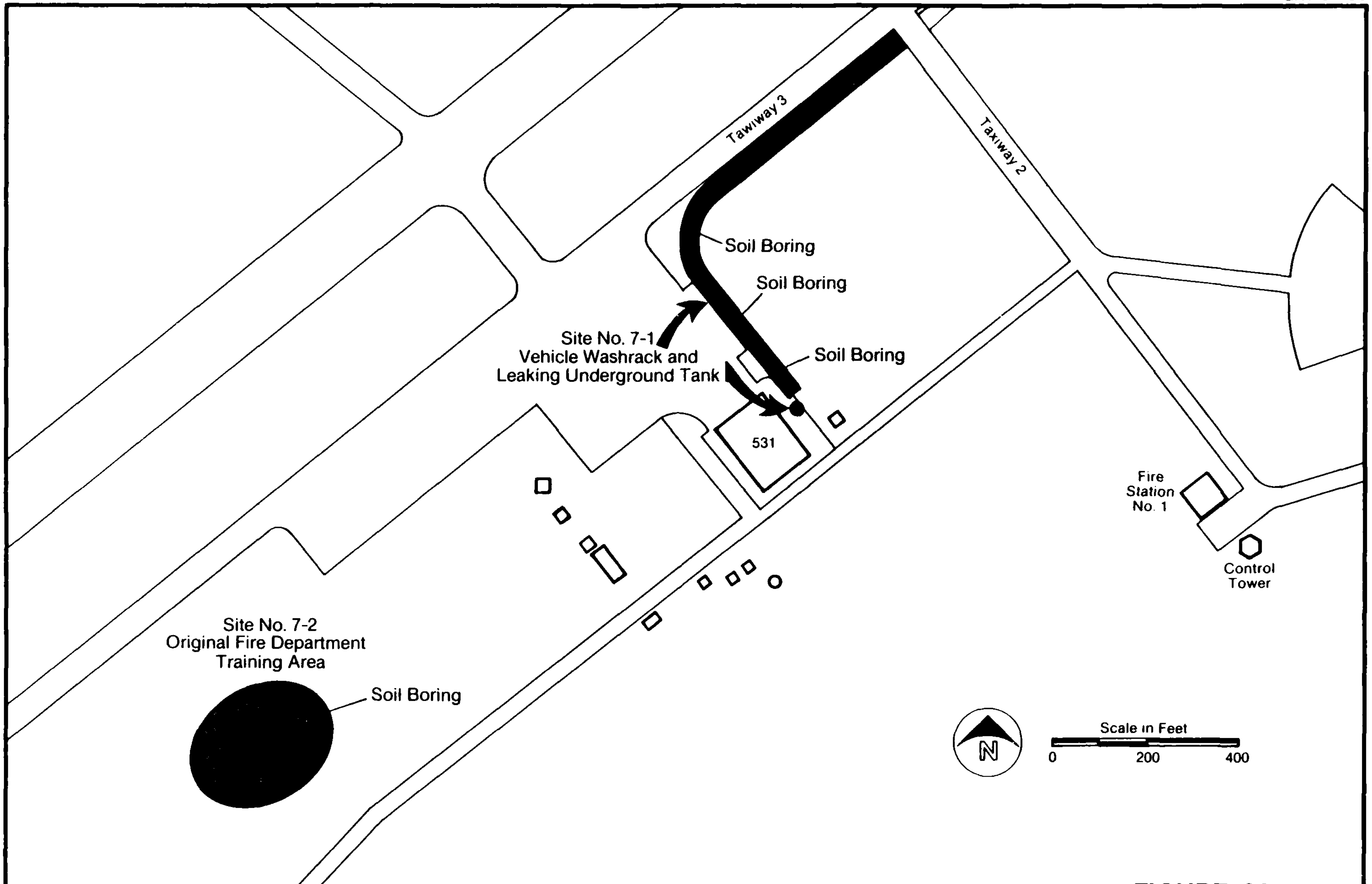

FIGURE 24.
Recommended Preliminary Sampling Locations for Site No. 7-1—
Vehicle Washrack and Leaking Underground Tank and Site No. 7-2—
Original Fire Department Training Area.

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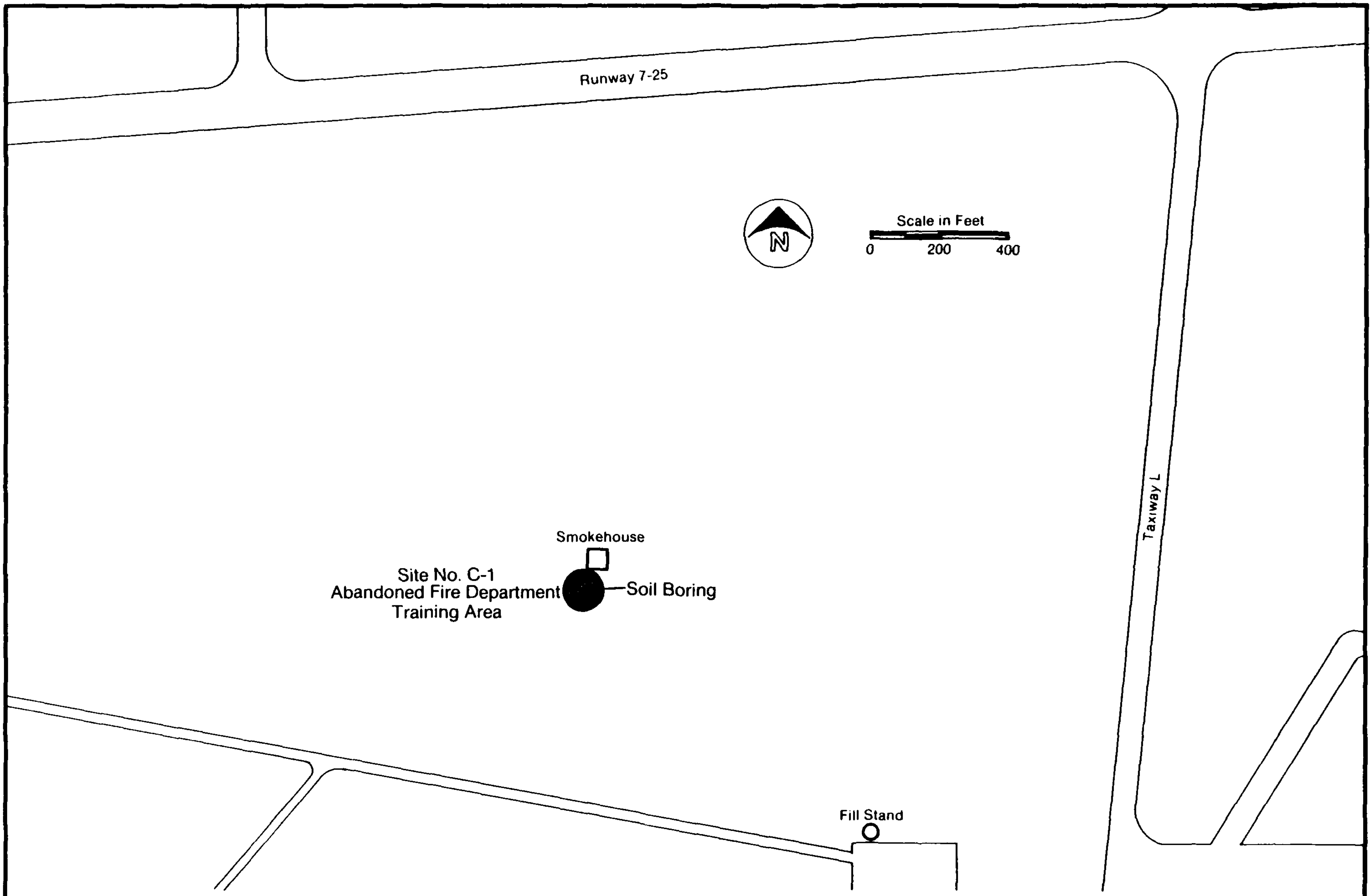

FIGURE 25.
Recommended Preliminary Sampling Locations for Site No. C-1—
Abandoned Fire Department Training Area.

1. A collection system and an oil/water separator should be installed at the vehicle washrack located adjacent to Building No. 531 to provide treatment of the condensate prior to discharge to the storm drainage system.

2. The UG waste oil tank located adjacent to the vehicle washrack should be removed, and alternate methods for the collection and storage of waste oils should be evaluated.

3. The integrity of the UG waste tank located adjacent to Building No. 531, which was used for the storage of waste battery acid, should be determined (e.g., by pressure testing).

4. The WWTP digested sludge should be analyzed for the characteristics of EP toxicity. (The treatment plant receives industrial wastewater, and the sludge is being used as a soil conditioner in areas around the treatment plant.)

5. All abandoned wells on AF Plant 42 should be located in the field. Any abandoned wells located in the vicinity of identified disposal and spills sites should be properly sealed to prevent a pathway for contaminant migration.

6. The 2,000-gallon AG tank utilized by the Fuel Flow Test facility and located in the storm drainage ditch between Sites No. 2 and No. 3 should be removed from the ditch. A collection tank of adequate capacity should be installed in a more acceptable location outside of the drainage ditch.

7. The abandoned POL tanks originally installed by the U.S. Army Air Corps should be located and the status of these tanks determined. If necessary, the tanks should be properly deactivated.

8. Determine the status of the asbestos containing material identified at Site No. 2-4, Abandoned Disposal Area.

GLOSSARY OF TERMS

GLOSSARY OF TERMS

ALLUVIUM - A general term for clay, silt, sand, gravel, or similar unconsolidated detrital material deposited during comparatively recent geologic time by a stream or other body of running water as a sorted or semisorted sediment in the bed of the stream or on its flood plain or delta.

AQUIFER - A geologic formation, or group of formations, that contains sufficient saturated permeable material to conduct ground water to yield economically significant quantities of ground water to wells and springs.

BOWSER - A small mobile tank used to recover and transport POL products.

CALICHE - A term applied broadly in the Southwest U.S. (especially Arizona) to an opaque, reddish-brown to buff or white calcareous material of secondary accumulation (in place), commonly found in layers on, near, or within the surface of stony soils of arid and subhumid climates. It is composed largely of crusts or succession of crusts of soluble calcium salts in addition to impurities such as gravel, sand, silt, and clay.

CONFINING STRATA - A strata of impermeable or distinctly less permeable material stratigraphically adjacent to one or more aquifers.

CONTAMINANT - As defined by section 104(a)(2) of CERCLA, shall include, but not be limited to, any element, substance, compound, or mixture, including disease causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be

anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformation, in such organisms or their offspring.

DOWNGRADIENT - A direction that is hydraulically down slope. The downgradient direction can be determined through a potentiometric survey or through the evaluation of existing water level elevations referenced to a common datum (mean sea level).

EP TOXICITY - A laboratory test designed to identify a solid waste as hazardous. A liquid extract from the solid waste is analyzed for selected metals and pesticides. If one or more of the parameters tested for is present in concentration greater than a maximum value then the solid waste is considered a hazardous waste in accordance with RCRA definition.

EVAPOTRANSPIRATION - Evaporation from the ground surface and transpiration through vegetation.

GROUND WATER - All subsurface water, especially that part that is in the zone of saturation.

HAZARDOUS WASTE (expanded version of the RCRA definition) - A solid waste which because of its quantity, concentration, or physical, chemical or infectious characteristics may -

(A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible, illness; or

(B) pose a substantial present or potential hazard to human health or the environment when improperly

treated, stored, transported or disposed of, or otherwise managed.

LEACHING - The separation or dissolving out of soluble constituents from a rock or ore body by percolation of water.

LOAM - A rich, permeable soil composed of a friable mixture of relatively equal and moderate proportions of clay, silt, and sand particles, and usually containing organic matter (humus) with a minor amount of gravelly material.

MIGRATION (Contaminant) - The movement of contaminants through pathways (ground water, surface water, soil, and air).

NET PRECIPITATION - Mean annual precipitation minus mean annual evapotranspiration. Evapotranspiration is sometimes estimated by pan evaporation measurements.

PD-680 (Type I and Type II) - A military specification for petroleum distillate used as a safety cleaning solvent. The primary difference between PD-680 Type I and Type II is the flash point of the material. The flash points are 100°F and 140°F for PD-680 Types I and II, respectively. Currently, only Type II is authorized for use at Air Force installations.

PERMEABILITY - The capacity of a porous rock, sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.

PLAYA - A Spanish term used in the Southwest U.S. for a dried-up, vegetation-free, flat-floored area composed of thin, evenly stratified sheets of fine clay, silt, or sand,

and representing the bottom (lowermost or central) part of a shallow completely closed or undrained, desert lake basin in which water accumulates (as after a rain) and is quickly evaporated, usually leaving deposits of soluble salts. It may be hard or soft, and smooth or rough. The term is also applied to the basin containing an expanse of playa.

PYROPHORIC - Capable of igniting spontaneously when exposed to air.

POTENTIOMETRIC SURFACE - An imaginary surface that represents the static head of ground water and is defined by the level to which water will rise in a cased well.

SOIL HORIZONS -

(A) A-Horizon - The uppermost mineral horizon of a soil; zone of leaching.

(B) B-Horizon - Occurs below the A-Horizon; the mineral horizon of a soil or the zone of accumulation.

(C) C-Horizon - Occurs below the B-Horizon; a mineral horizon of a soil consisting of unconsolidated rock material that is transitional in nature between the parent material below and the more developed horizons above.

STRATA - Plural of stratum.

STRATUM - A single and distinct layer, of homogeneous or gradational sedimentary material (consolidated rock or unconsolidated earth) of any thickness, visually separable

from other layers above and below by a discrete change in the character of the material deposited or by a sharp physical break in deposition, or by both.

UNSATURATED ZONE (Vadose Zone or Zone of Aeration) - A subsurface zone containing water under pressure less than that of the atmosphere, including water held by capillarity; and containing air or gases generally under atmospheric pressure. This zone is limited above by the land surface and below by the surface of the zone of saturation.

UPGRADIENT - A direction that is hydraulically up slope. The upgradient direction can be determined through a potentiometric survey or through the evaluation of existing water level elevations referenced to a common datum (mean sea level).

WATER TABLE - The upper limit of the portion of the ground completely saturated with water.

LIST OF ACRONYMS, ABBREVIATIONS AND SYMBOLS USED IN THE TEXT

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS USED IN THE TEXT

AF	Air Force
AFESC	Air Force Engineering and Services Center
AG	Aboveground
AGE	Aerospace Ground Equipment
ASD	Aeronautical Sysems Division
AVGAS	Aviation Gasoline
Bldg.	Building
bls	Below Land Surface
BOD_5	Biochemical Oxygen Demand (5-day)
°C	Degrees Celsius (Centigrade)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
cm/sec	Centimeters per Second
COD	Chemical Oxygen Demand
DEQPPM	Defense Environmental Quality Program Policy Memorandum
DoD	Department of Defense
EPA	Environmental Protection Agency
°F	Degrees Fahrenheit
ft/min	Feet per Minute
gal/yr	Gallons per Year
gpd	Gallons per Day
gpm	Gallons per Minute
HARM	Hazard Assessment Rating Methodology
IRP	Installation Restoration Program
JP	Jet Petroleum
JPTS	Jet Petroleum Thermally Stable
lb	Pounds
lb/yr	Pound(s) per Year
MEK	Methyl Ethyl Ketone
mg/l	Milligram(s) per Liter
mgd	Million Gallons per Day
MIBK	Methyl Isobutyl Ketone
ml	Milliliter
mo.	Month

MOGAS	Motor Gasoline
mph	Miles per Hour
msl	Mean Sea Level
NDI	Non-Destructive Inspection
No.	Number
NPDES	National Pollutant Discharge Elimination System
OEHL	Occupational and Environmental Health Laboratory
PCB	Polychlorinated Biphenyls
POL	Petroleum, Oil, and Lubricants
ppm	Parts per Million
RCRA	Resource Conservation and Recovery Act
RDTE	Research, Development, Testing, and Evaluation
SCS	Soil Conservation Service
TDS	Total Dissolved Solids
TEB	Triethylborine
TOX	Total Organic Halogen
TSS	Total Suspended Solids
TPS	Thermal Protection System
UG	Underground
USAF	United States Air Force
USDA	United States Department of Agriculture
VOC	Volatile Organic Compound
WWTP	Wastewater Treatment Plant

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REFERENCES

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APPENDICES

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Appendix A
RESUMES OF TEAM MEMBERS

GREGORY T. MCINTYRE
Environmental Engineer

Education

M.S., Environmental and Water Resources Engineering, Vanderbilt University
B.S., Environmental Engineering, University of Florida

Experience

Mr. McIntyre is a project engineer in CH2M HILL's Industrial Processes Division, Department of Solid and Hazardous Waste. His responsibilities involve projects dealing with hazardous waste management, industrial waste treatment processes, and laboratory and pilot plant treatability studies.

Mr. McIntyre has extensive experience in hazardous waste projects. He participated in the development of the Remedial Action Master Plan (RAMP) for the Highlands Acid Pits and Bayou Sorrel Superfund hazardous waste sites. He was project manager for the Highlands Acid Pits RAMP. The purpose of the RAMP is to assemble and analyze existing data and to identify the scope and sequence of remedial projects.

Mr. McIntyre participated in the compilation and evaluation of existing groundwater data for Phase I of the Biscayne Aquifer/Dade County Superfund hazardous waste study. He also participated in the Phase II sampling, analytical, and investigative program for the protection of the Biscayne Aquifer and Environment in North Dade County, Florida.

Mr. McIntyre has been a team member in hazardous materials disposal site records searches for eight U.S. Air Force installations throughout the United States. He was the project manager for the Twin Cities Air Force Reserve Base Records Search. The purpose of the records search is to assess the potential for hazardous contaminant migration from past disposal practices and to recommend follow-up actions.

Mr. McIntyre's industrial wastewater experience includes wastewater characterization, laboratory bench-scale treatability study, evaluation of existing pretreatment facilities, and conceptual design for the equalization and aerobic biological treatment of industrial wastewater for Hercules, Inc.

GREGORY T. MCINTYRE

Mr. McIntyre also participated in the physical, chemical, and biological monitoring study of the effluent discharge mixing zone and the evaluation of the wastewater treatment system performance for the Air Products and Chemicals, Inc., Escambia Plant.

Before joining CH2M HILL, Mr. McIntyre worked as a research assistant in graduate school. One of his responsibilities was to research the removal of heavy metals, including copper, zinc, and trivalent chromium, using a large-scale adsorbing colloid foam flotation pilot plant.

Professional Registration

Engineer-In-Training, Florida

Membership in Professional Organizations

American Society of Civil Engineers
American Water Works Association
Water Pollution Control Federation
Florida Pollution Control Federation
Tau Beta Pi

Publications

With E. L. Thackston, J.J. Rodriguez, and D.J. Wilson. "Copper Removal by an Adsorbing Colliod Foam Flotation Pilot Plant." Separation Science and Technology, 17(2). 1982.

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With E.L. Thackston, J.J. Rodriguez, and D. J. Wilson. "Pilot Plant Studies of Copper, Zinc, and Trivalent Chromium Removal By Adsorbing Colloid Foam Flotation." Tennessee Water Resources Research Center, Research Report No. 88. August 1981.

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GNRE2

J. KENDALL CABLE
Environmental Engineer

Education

M.E., Civil Engineering, University of Tennessee
B.S., Civil Engineering, University of Tennessee

Experience

Mr. Cable's responsibilities at CH2M HILL involve projects dealing with hazardous and solid waste management and industrial waste treatment processes. He is also involved in municipal water and wastewater treatment projects.

Mr. Cable's hazardous waste experience includes hazardous materials records search for the United States Air Force, in which past hazardous material disposal sites were identified and suspected problems associated with the sites were evaluated. He also worked on a conceptual design and conducted pilot testing on a prototype packed tower aeration unit for removal of volatile organic compounds (VOC's) from groundwater in Port Malabar, Florida.

Mr. Cable's industrial wastewater experience includes a bench-scale treatability study and conceptual design for the American Hoechst Corporation in Mt. Holly, North Carolina; wastewaters generated at the facilities were a complex mixture of synthetic organic compounds. He also participated in a pilot plant treatability study and conceptual design for Hercules, Inc., in Brunswick, Georgia; wastewaters generated at the facilities resulted from the production of organic gum and wood chemicals, cellulose-based water-soluble polymers, and specialty organic chemicals.

Mr. Cable's municipal wastewater studies have included a wastewater master plan for Manatee County, Florida, an addendum to the West Pasco County Wastewater Facilities Plan--New Port Richey Service Area, and a cost-effective analysis of two types of package wastewater treatment plants. He also contributed to a study for the U.S. Army Corps of Engineers to develop functions for estimating the capital and O&M costs associated with surface-water intake systems. The cost functions were verified using cost data from projects previously designed by CH2M HILL. He conducted a sampling program and developed design flow and loads for the Ocean Springs Regional Land Treatment System. He helped to develop conceptual documents and design instructions for the Ocean Springs Regional Land Treatment System in Ocean Springs, Mississippi. The system included a 75-acre multicellular facultative lagoon, a 15.75-mgd pump

station, and 415 acres of sprinkler irrigation with subsurface drainage. He evaluated the flows, loads, and operating efficiency of an existing facultative lagoon in Ridge Spring, South Carolina. From this information, he developed a conceptual design for an aerated lagoon for the town. He conducted a sampling program and evaluated the existing and future capacity of a 1.0-mgd activated sludge WWTP in Silver Springs Shores near Ocala, Florida. He also participated in development of a municipal sludge disposal plan for the Pascagoula/Moss Point Regional Wastewater Treatment Plant in Pascagoula, Mississippi. In this project, various sludge disposal options were evaluated, and land application on privately owned farmland was selected. Based on this information, a disposal plan and feasibility study were developed. He also evaluated the method of municipal sludge land application used by a WWTP located in Silver Springs Shore near Ocala, Forida.

Professional Registration

Engineer-In-Training, Tennessee

Membership in Professional Organizations

American Society of Civil Engineers
Water Pollution Control Federation
Chi Epsilon
Toastmasters

Publications

"An Evaluation of the Adsorption and Flotation of Nonpolar Organic Compounds in Clay Colloid Suspensions." Masters Thesis, University of Tennessee. 1980.

"Developing Cost Estimating Methods for Surface Water Intake Structures." Presented at ASCE National Specialty Conference entitled Water Supply--The Management Challenge in Conjunction with the U.S. Army Engineer Waterways Experiment Station, Tampa, Florida. March 1983.

GARY E. EICHLER
Hydrogeologist

Education

M.S., Geology with Minor in Civil Engineering, University of Florida
B.S., Cum Laude, Construction and Geology, Utica College of Syracuse University

Experience

Mr. Eichler has been responsible for groundwater projects for both water supply and effluent disposal. Studies have included site selection, well design, construction services, monitoring and testing programs, determination of aquifer characteristics, and well field design. In addition, he has conducted numerous studies to determine pollution potential of toxic and hazardous wastes. Prior to joining CH2M HILL, Mr. Eichler was an engineering geologist with an environmental consulting firm. His responsibilities included project management, soils investigations, siting studies, groundwater and surface-water reports, and federal and state environmental impact studies.

Mr. Eichler has been responsible for exploration drilling, testing and design of well fields having a combined total installed capacity of over 75 mgd. Many of these well fields for potable water supply are located in the coastal aquifer in close proximity to saltwater.

His experience includes responsibility for the design and installation of shallow aquifer well fields in unconsolidated formations. Mr. Eichler has designed and installed screened wells, both natural and gravel packed, as well as open hole wells using both cable tool and rotary drilling methods.

Project responsibilities have included management and team participation on more than 20 hazardous waste disposal projects. The studies included initial site investigations, determination of pollutant travel time and direction, and evaluation of the potential for contaminant migration.

Mr. Eichler has been involved in geophysical logging and performance testing of deep disposal wells for both municipal effluent and hazardous waste.

He has conducted projects to determine saltwater intrusion potential and has been responsible for the design of monitoring programs to warn against intrusion.

GARY E. EICHLER

Mr. Eichler has conducted hydrogeological projects using aquifer computer modeling techniques to predict the effects of future large scale groundwater withdrawals.

Professional Registration

Certified Professional Geologist, Certificate No. 4544

Membership in Professional Organizations

American Institute of Professional Geologists
American Water Resources Association
Association of Engineering Geologists
Geological Society of America
Southeastern Geological Society
National Water Well Association
Florida Well Drillers Association

Publications

With U. P. Singh, C. R. Sproul, and J. I. Garcia-Bengochea. "Aquifer Testing of the Boulder Zone of South Florida." ASCE Publication Preprint 82-030. 1982.

Engineering Properties and Lime Stabilization of Tropically Weathered Soils. Master's Thesis. Department of Geology, University of Florida. August 1974.

GNRE3

BRIAN H. WINCHESTER
Department Manager, Environmental Sciences

Education

B.S. Wildlife Ecology, University of Florida

Experience

Mr. Winchester is currently responsible for environmental sciences marketing and technical quality in CH2M HILL's five Florida offices. He has a broad range of experience in the management of multidiscipline projects, design and implementation of field sampling programs, data interpretation, impact assessment and prediction, impact mitigation and remedial method development, report preparation and review, and expert consultation at client/agency hearings. He has successfully prepared numerous Environmental Impact Statements (EIS's), Developments of Regional Impact reports (DRI's), and environmental assessments for a variety of industries, utilities, and public agencies.

Mr. Winchester has directed or participated in a number of aquatic ecology projects in the southeastern U.S. He provided program management and technical input for two separate 2-year NPDES-related monitoring studies in upper Escambia Bay. Study components included water chemistry, phytoplankton, benthic macroinvertebrates, and interaction with the Florida Department of Environmentl Regulation (FDER). He also served as technical manager for the preparation of 301(h) waiver applications and associated Phase I studies for five ocean outfalls in southeastern Florida. Program components included definition of current and vertical density gradient patterns, water chemistry, sediment characteristics, plankton communities, benthic macroinvertebrate communities (including hardground/coral reef communities), demersal fish populations, and assessment of impacts associated with reduced treatment levels of ocean discharge.

Mr. Winchester is currently directing a multidiscipline environmental program for the Key West Utility Board, which includes preparation of NPDES permits and NPDES-related monitoring studies of cooling water impacts on water chemistry, seagrass beds, macrobenthos, and demersal fish.

Other relevant projects for which Mr. Winchester has had management or technical responsibility include a study of seagrass and oyster bed communities in the Withlacoochee estuary; an ichthyoplankton entrainment study in southeastern Florida; fish population studies in seagrass

beds off south and west-central Florida; a CEIP assessment of potential impacts associated with oil and gas industry development in the Tampa Bay area; long-term biological monitoring of tidal creek systems in northeastern Florida; an EIS assessment of maintenance dredging impacts along the 300-mile Gulf Intracoastal Waterway in Louisiana; and a synthesis of published and unpublished information on benthic macroinvertebrate community structure in northern Gulf of Mexico estuaries.

In addition to the above projects, Mr. Winchester has managed or participated in over 40 other environmental studies associated with channelization impacts, phosphate mining, treatment of secondary effluent with wetland systems, wetland valuation, biological impacts of air emissions, water table drawdown impacts, dredged material disposal, corridor studies, power plant blowdown impacts, rare and endangered species, and hazardous waste studies.

Membership in Professional Organizations

Society of Wetland Scientists
Ecological Society of America
City of Gainesville Hazardous Materials Committee
City of Gainesville Water Quality Committee

Publications

Mr. Winchester has authored several technical papers on wetland ecology, rare and endangered species management, and other topics. Representative papers include the following:

"Dry Season Wastewater Renovation by a North Florida Hardwood Swamp." Wetlands (in press). 1983.

"Assessing Ecological Value of Central Florida Wetlands." A Case Study." Proceedings of the Eighth Annual Conference on the Restoration and Creation of Wetlands, 8:25-38. 1981.

"Valuation of Coastal Plain Wetlands in the Southeastern United States." Symposium on Progress in Wetlands Utilization and Management, Orlando, Florida. pp 285-298. 1981.

With L. D. Harris. "An Approach to Valuation of Florida Freshwater Wetlands." Proceedings of the Sixth Annual Conference on the Restoration and Creation of Wetlands, 6:1-26. 1979.

Appendix B
OUTSIDE AGENCY CONTACT LIST

Appendix B
AGENCY CONTACT LIST

1. California Regional Water Quality Control Board, Lahontan Region
   Victorville, California
   Mr. Robert Dodds
   Mr. Nelson Wong
   619/245-6583

2. U.S. Environmental Protection Agency Region IX
   Toxic and Waste Management Section
   San Francisco, California
   Ms. Alexis Strauss
   415/974-8119

3. California Department of Health Services
   Hazardous Waste Management Section
   Los Angeles, California
   Mr. Dave Wong
   213/620-2386

4. California Department of Water Resources
   Los Angeles, California
   Mr. Carlos Medrid
   Mr. J. Kemp
   213/620-4096

5. U.S. Geological Survey
   Water Resources Division
   Luguna Niegel, California
   Mr. Dick Moyle
   714/831-4232

6. Regional Planning Department
   Lancaster, California
   213/945-6408

7. Antelope Valley East Kern Water Agency
   Palmdale, California
   Mr. Russell Fuller
   213/944-1275

8. Palmdale Water District
   Palmdale, California
   Mr. Gary Burns
   213/947-4111

9. U.S.D.A. Soil Conservation Service
   Lancaster, California
   805/942-7125

Appendix C
AF PLANT 42 RECORDS SEARCH INTERVIEW LIST

Appendix C
AF PLANT 42 RECORDS SEARCH INTERVIEW LIST

Interviewee	Area of Knowledge	Years at Installation
1	Operations	3
2	Facilities	3
3	History of Operations	22
4	Rockwell Space Environmental Control	2
5	Rockwell Space Plant Facilities	14
6	Rockwell Space Industrial Activities	6
7	Rockwell Space Maintenance	8
8	Lockheed Operations	22
9	Lockheed Operations	31
10	Lockheed Operations	27
11	Lockheed Facilities	11
12	Lockheed Operations	29
13	Lockheed Operations	14
14	Northrop Facilities and Operations	29
15	Northrop Facilities	6
16	Northrop Maintenance	4
17	Northrop Plant Engineering	16
18	Northrop Facilities	1
19	Rockwell Aircraft Environmental Control	2
20	Rockwell Aircraft Plant Services	25
21	Rockwell Aircraft Customer Relations	21
22	Rockwell Aircraft Plant Services	22
23	Rockwell Aircraft Plant Services	22
24	Rockwell Aircraft Transportation	9
25	Nero Fire Alarm/Operations	20
26	Nero Pavement/Operations	22
27	Nero Fire Alarm/Operations	11
28	Nero Security/Operations	21
29	Nero Maintenance	27
30	Nero Fire Department Training	17
31	Nero Painting Operations	9
32	Nero Pesticide Application	27
33	Nero Maintenance	9
34	Nero Maintenance	20
35	Nero Fire Department Training	27
36	Nero Fire Department Training	11
37	Nero Sanitation and Water Plant	5
38	Nero Fuels Maintenance	6

Appendix D
INSTALLATION HISTORY

Appendix D
INSTALLATION HISTORY

The information regarding the history of AF Plant 42 was obtained from Tab A-1 and onsite interviews.

The Palmdale Airport began as a U.S. Army Air Corps base in 1940 when the Works Progress Administration built the first concrete runways. The Army Air Corps used the base during World War II for an emergency landing strip and B-25 transition training. Los Angeles County purchased the facility for use as a county airport when the Army declared it surplus after World War II in 1946.

The Palmdale concept originated because of the serious problem of flight testing high performance jet aircraft in and over heavily populated areas. The Los Angeles Chamber of Commerce subcommittee dealing with these problems recognized the value of a place such as Palmdale for utilization in aircraft flight testing in and over a sparsely settled area where ideal weather represented a valuable asset to such a program.

In 1949, the Air Force was represented on this important subcommittee and, by joint planning, had a survey made of all airports within a 150-mile radius of Los Angeles. The Los Angeles County Airport at Palmdale was finally determined to be the most suitable location, and the committee's proposal was directed to Secretary of the Air Force W. Stuart Symington on October 19, 1949.

In 1950, the Air Force encouraged Lockheed Aircraft Corporation (LAC) to utilize Palmdale Airport for final assembly and flight testing of aircraft, and LAC signed a lease with Los Angeles County for 237 acres on which to construct the necessary facilities, with the right to use

the existing runway and control tower. At that time, the Palmdale Airport facilities consisted of one 7,000-foot runway, two 5,200-foot runways, taxiways, utilities, a control tower, a new administration building, a small Butler-type hangar, and miscellaneous World War II temporary construction type buildings.

The Air Force, in a letter dated 16 August 1951, authorized Lockheed Aircraft Corporation to construct facilities for production aircraft and to develop a Master Plan for the common use area. The Facilities Contract dated 27 May 1952, superseded and completed this letter agreement with Lockheed Aircraft Corporation.

In October 1951, USAF Headquarters asked the 82nd Congress for authority to acquire the 4,870 acres comprising the Palmdale Airport. The acquisition document pointed out that approximately 950 acres of this total area had been held in fee simple by the Army Air Corps during World War II, that disposal of the land had been made later by Quitclaim Deed to Los Angeles County, and that under the then current (Korean) emergency, the U.S. Government had the right to "recapture" not only the 950 acres, but also the added acreage (some 3,050 acres) since acquired by the county. The proposal advised against invoking the "recapture" procedure because the entire property plus improvements would revert to the County of Los Angeles once the current emergency officially ended. The proposal further indicated that according to preliminary investigation, the entire airport (4,870 acres plus improvements) could be purchased for approximately $1 million. The Air Force urged the purchase of the site.

On 26 February 1952, the Board of Supervisors of Los Angeles County, by Resolution granted to the United States Government right-of-entry to the county's Palmdale Airport, effective 19 February 1952.

In January 1953, the Government entered into a Facilities Contract effective 3 April 1952, with North American Aviation, Inc., granting exclusive use of approximately 272 acres and providing funds for required facilities to support aircraft production and engineering fight test programs. The Government also contracted with Northrop Corporation, granting exclusive use of approximately 220 acres for a final mating, production, and Air Force acceptance flight test facility.

Under letter supplemental agreement dated 15 November 1952, the Government authorized Lockheed Aircraft Corporation to construct joint use facilities and secure engineering design and architectural services. On 13 October 1953, by Supplemental Agreement Number 1, the Government gave Lockheed Aircraft Corporation authority to provide services for the operation and maintenance of the common facilities.

Lockheed Aircraft Corporation subcontracted to Early-Stolte Company a joint venture for Phase I construction. Phase I consisted of the following:

1. Extending the existing northeast-southwest runway from 7,000 feet to 12,000 feet, widening only the new extension from 150 feet to 200 feet, and constructing the related taxiways.

2. Constructing a fire protection water system which included aboveground storage capacity of 1,800,000 gallons.

3. Constructing two pumping stations capable of supplying water at a maximum volume of 24,000 gpm at pressures in excess of 100 psi which would be delivered to each industrial site through a 20-inch main.

4. Constructing a sewage treatment plant designed for future needs up to 50,000 employees.

5. Providing a fire protection deluge system in all permanent sites from two pumping stations replenished by four deep-water wells. They were designed so that in case of electrical power failure, water would be available at the maximum rate of 12,000 gpm from propane-operated automatically started pumps. If one station should become disabled, the other would supply the deficiency.

6. Constructing utility tunnels under the proposed runway complex for water, sewage, and electricity from one side of the base to the other.

Air Force Logistics Center requested a Master Plan be prepared in 1950. The firm of Pereira & Luckman, Architect-Engineer, was selected to develop the Master Plan which was completed on 8 August 1952, and was approved by the Air Force on 27 February 1953. Palmdale Airport then became Air Force Plant Number 42, its current official name designation, and in December 1954 became Government-owned. In November 1962, a descriptive title was approved by Headquarters USAF and the installation officially became Production Flight Test Installation, Air Force Plant Number 42, Palmdale, California.

The Southern Pacific Railroad and the California State Highway Commission both objected to the Master Plan because the railroad and the highway, which are adjacent to the airport property on its west boundary, were dangerously near the west end of the runways. The runway layout was revised to move the east-west runway complex approximately 600 feet to the east to overcome the objections of the railroad and the State Highway Commission.

Revisions to the Master Plan, completed 7 September 1954, also included an area for an Air Force Department Industrial Reserve Storage (AFDIER) warehouse, an additional industrial site on the north side to accommodate Convair, roads, railroads, water supply, and other miscellaneous changes. The original Master Plan included dual parallel runways and taxiways but these were deleted from the plan by Air Force Logistics Command in 1958. Phase II of the Master Plan, including a new east-west runway (7-25) and supporting taxiways, was constructed in 1956.

The question of price had been satisfactorily shelved in earlier negotiations with an agreement that the county would be reimbursed at the "present" fair market price. The Los Angeles County Engineer declared the Palmdale Airport property to be worth $4 million as a civilian airport. The County Appraiser set a value of $1,310,000 on the land, while the Corps of Engineers appraised it at $1,285,000. The Air Force representative held that $1 million was a fair price and Headquarters AFLC concurred. The Los Angeles County Attorney advised the Board of Supervisors that it could not legally accept an arbitrary amount so the Government paid $1,285,000 to Los Angeles County on 21 February 1954.

The size of the plant, which began with 237.37 acres leased by Lockheed, grew to 4,860.00 acres when the purchase was concluded. Of this total amount, 4,550 acres had been Los Angeles County property and cost $1,285,000. The remaining 310 acres belonged to provide individuals and cost $135,548.52. Acquisition of approach zone property in 1956 and 1957, plus other small parcels, brought the total acreage to 5,473.63 acres by the end of 1957. Additional purchases by the Corps of Engineers over the period ending May 1, 1960, increased the total acreage to 5,772.71 acres, which also included 290.61 acres in obstruction easements. During 1961, the Air Force transferred 13.41 acres of land

to the Federal Aviation Administration to enable that agency to construct a multi-million-dollar facility to provide an Air Route Traffic Control Center which would control all enroute air traffic within a designated area in the southwestern part of the United States, thus reducing total acreage to 5,759.30 acres. In 1962, 79.38 acres were purchased by condemnation for approach zones, bringing the total acreage to 5,838.68. During 1970, the Air Force transferred an additional 5.88 acres to the Federal Aviation Administration for expansion of their facility and the leased property (0.71 acre) utilized for the outer market of the Instrument Landing System was released, for a total present acreage of 5,832.09.

On 10 November 1953 Air Force Logistics Center transferred command jurisdiction from SBAMA to SMAMA. The prime contractor, Lockheed Aircraft Corporation, subcontracted that portion of the contract providing services for the operation and maintenance of Common Facilities to Lockheed Air Terminal, Inc. Lockheed Air Terminal officially assumed the responsibility with a manager, maintenance men, firemen, policemen, and other technicians on 15 February 1954, and continued as a subcontractor under Lockheed Aircraft Corporation contract until 14 October 1958, at which time a prime contract was awarded to Lockheed Air Terminal, Inc. On 1 July 1963, the prime contract for the above services was awarded to Vinnell Corporation. ITT Technical Services, Inc. was awarded the prime contract for operation and maintenance of Common Facilities on 1 July 1964, and served until 30 June 1973. Tumpane Company was awarded the prime contract for operation and maintenance of the common facilities on 1 July 1973, and served to 30 June 1975, at which time Serv-Air Inc. took over and served until 30 June 1980. Since 1980, Nero and Associates, Inc. have been the prime contractor for common facilities at AF Plant 42.

Since the activation of AF Plant 42, contractors which include Rockwell International Space Business Support Services and Aircraft Operations, Lockheed Aircraft Corporation, Douglas Aircraft Corporation, Convair (Consolidated Vultec Aircraft Company), and Northrop Aircraft Division, have manufactured and flight tested numerous aircraft for the U.S. Air Force. In a special program with NASA, Rockwell International Space Tansportation and Systems Group also developed and produced the space shuttles for the space shuttle program at AF Plant 42. A historical summary of the contractors who have worked at each site, the time period of their involvement, and the representative aircraft being constructed, maintained, or flight tested is presented in Table 2, Section II.B.

The Air Force Contract Management Division is responsible for AF Plant 42. The primary mission of AF Plant 42 is to provide and maintain facilities for: (1) final assembly of jet aircraft, (2) production engineering and flight testing programs, and (3) Air Force acceptance flight testing of high performance jet aircraft manufactured by DoD contractors assigned to AF Plant 42.

Appendix E
MASTER LIST OF INDUSTRIAL OPERATIONS

Appendix E
MASTER LIST OF INDUSTRIAL OPERATIONS

Shop Name	Present Location and Dates (Building No.)		Past Location and Dates (Building No.)		Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
Rockwell Space	Site No. 1	1973-Pres.					
Ultrasonic Etching Shop			295	1980-1982	--	--	No longer in operation
Tile Machine Shop	743	1973-Pres.			X	--	Consumed in use
Coating Shop	743	1973-Pres.			X	--	Consumed in use
Numerical Control Center	743	1973-Pres.			--	--	
Densification Shop	743	1979-Pres.			X	X	Drummed and transported to Rockwell Downey Facility[a]
Pulse Velocity Test Shop	743	1973-Pres.			--	--	
Equipment Cleaning	295	1983-Pres			X	--	No waste generated to date
Shuttle Assembly	294	1973-Pres.			X	X	Drummed and transported to Rockwell Downey Facility[a]
Calibration Lab	294	1973-Pres.			X	X	Drummed and transported to Rockwell Downey Facility[a]
Analytical Lab	294	1973-Pres.			--	--	
Maintenance Paint Booth	Outside, North of 295	1973-Pres.			X	X	Drummed and transported to Rockwell Downey Facility[a]
Lockheed	Site No. 2	1964-Pres.	Site No. 1	1958-1973			
	Site No. 5	1979-Pres.	Site No. 4	1971-1983			
			Site No. 5	1952-1972			
General Maintenance Shop	210	1964-Pres.			X	X	Drummed and transported to Lockheed Burbank Facility[a]
Paint Shop (Site No. 2)	211	1954-Pres.			X	X	3,000-gallon UG collection sump pumped out and removed by a contractor[a]
Fuel Tank Seal Shop	210	1964-Pres.			X	X	Drummed and transported to Lockheed Burbank Facility[a]
AGE/Vehicle Maintenance Shop	212	1964-Pres.			X	X	Drummed and transported to Lockheed Burbank Facility[a]
Fuel Flow Test Facility	214	1964-Pres.			X	X	2,000-gallon AG tank pumped to fuel truck and removed by a contractor[a]
Paint Shop (Site No. 5)	427	1979-Pres.			X	X	Drummed and transported to Lockheed Burbank Facility[a]
TF-1 Preliminary Final Assembly	420	1979-Pres.			X	--	Consumed in use
Rockwell Aircraft	Site No. 3	1971-Pres.	Site No. 1	1954-1958			
	Site No. 4	1983-Pres.	Site No. 2	1962-1964			
	Site No. 1, 295	1983-Pres.	Site No. 3	1961-1967			
			Site No. 4	1966-1971			
Forward Fuselage Assembly	301	1971-Pres.			X	X	Drummed and removed by contractor[a]
Sub Assembly	307	1971-Pres.			X	X	Drummed and removed by contractor[a]
Dionized Water Production	North of 305	1954-Pres.			X	X	Neutralization to WWTP
Paint Booths	305	1954-Pres.			X	X	Two 3,000-gallon UG collection sumps pumped out and removed by a contractor[a]
Maintenance Shop	308	1971-Pres.			--	--	
Transportation Shop	308	1971-Pres.			X	X	Drummed and removed by contractor[a]
Tooling Shop	308	1971-Pres.			--	--	
Nickle Plating Operation			307	1963-1966	X	X	Evaporation pits; no longer in operation

[A]Waste materials transported off AF Plant 42.

Appendix E--Continued

Shop Name	Present Location and Dates (Building No.)		Past Location and Dates (Building No.)		Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
Northrop	Site No. 5	1973-Pres.[b]	Site No. 2	1953-1958			
			Site No. 3	1958-1963			
			Site No. 5	1963-1973			
Canopy and Windshield Shop	410	1973-Pres.	421	1963-1973	X	X	Drummed and transported to Northrop Hawthorne Facility[a]
Major Assembly	421	1963-Pres.			X	X	Drummed and transported to Northrop Hawthorne Facility[a]
Sub Assembly	421	1963-Pres.			X	X	Drummed and transported to Northrop Hawthorne Facility[a]
Final Assembly and Checkout	421	1963-Pres.			X	X	Drummed and transported to Northrop Hawthorne Facility[a]
Engine Shop	421	1963-Pres.			X	X	Drummed and transported to Northrop Hawthorne Facility[a]
Safety Operations	401	1972-Pres.	421	1963-1972	X	X	Drummed and transported to Northrop Hawthorne Facility[a]
Fuel Systems Repair Shop	459	1973-Pres.			X	X	3,000-gallon AG tank pumped out and removed by contractor[a]
Engine Test Cell	457	1973-Pres.			--	--	
Packing and Crating	455	1973-Pres.			--	--	
Nero and Associates and Past Service Contrators[c]							
Paint Shop	550	1954-Pres.			X	X	Drummed and removed by contractor[a]
Vehicle Maintenance Shop	531	1954-Pres.			X	X	400-gallon UG waste tank pumped out and removed by contractor[a]
Pesticide Application	West of 550	1954-Pres.			X	--	Consumed in use
Battery Shop	531	1954-Pres.			X	X	Contractor removal[a]
Sanitation and Water Plant	544	1954-Pres.			--	--	

[a]Waste materials transported off AF Plant 42.

[b]Primary tenant at Site No. 5.

[c]Refer to Table 2, Section II.B for list of past service contractors.

Appendix F
INVENTORY OF MAJOR EXISTING POL STORAGE TANKS

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INVENTORY OF MAJOR EXISTING POL STORAGE TANKS

Industrial Location	Building No.	Type POL	Capacity (gallons)	Aboveground (AG) Underground (UG)
Site No. 1	5	AVGAS	250	AG
	--	MOGAS	1,000	AG
	292	JP-7	25,000	UG
	292	JP-7	25,000	UG
	293	JP-5	50,000	UG
	--	JP-4	5,000	UG
	293	Fuel Oil	1,000	UG
	294	MOGAS	1,000	UG
	295	MOGAS	100	UG
	295	Fuel Oil	10,000	UG
	740	Fuel Oil	25,000	UG
	290	Fuel Oil	50,000	UG
	297	MOGAS	5,000	UG
Site No. 2	214	JP-7	50,000	UG
	214	JP-7	50,000	UG
	210	Diesel	15,000	UG
	214	JPTS	12,000	UG
	215	JP-7	4,000	AG
	210	MOGAS	10,000	UG
Site No. 3	301	MOGAS	100	UG
	301	MOGAS	100	UG
	--	JP-4	25,000	UG
	302	Fuel Oil	50,000	UG
	305	MOGAS	100	UG
	307	MOGAS	100	UG
	308	MOGAS	65	AG
	308	MOGAS	500	--
	308	MOGAS	10,000	UG
	310	Fuel Oil	30,000	UG
	310	Fuel Oil	30,000	UG
	310	Fuel Oil	30,000	UG
	310	Fuel Oil	30,000	UG
	310	Fuel Oil	5,000	UG
	304	JP-7	20,000	UG
	304	JP-7	20,000	UG
	304	JPTS	25,000	UG
	318	Fuel Oil	25,000	UG
	318	Fuel Oil	25,000	UG
	--	Fuel Oil	25,000	UG
	--	AVGAS	250	UG
	--	MOGAS	10,146	AG

Appendix F--Continued

Industrial Location	Building No.	Type POL	Capacity (gallons)	Aboveground (AG) Underground (UG)
Site No. 4	13	Kerosene	5,000	UG
	19	MOGAS	1,000	UG
Site No. 5	100	MOGAS	8,000	UG
	--	JP-4	19,000	UG
	--	JP-4	20,000	UG
	--	JP-4	25,000	UG
	--	JP-4	25,000	UG
	--	JP-4	25,000	UG
	--	AVGAS	2,300	UG
	--	AVGAS	1,750	UG
	401	Fuel Oil	100	UG
	410	Fuel Oil	100	UG
	410	Fuel Oil	20,000	UG
	410	Fuel Oil	20,000	UG
	410	Fuel Oil	20,000	UG
	420	MOGAS	125	--
	421	Fuel Oil	100	UG
	426	Waste Fuels	800	--
	427	Solvents	6,000	--
	305	Propane	500	AG
	305	Propane	500	AG
	425	MOGAS	250	AG
	453	Propane	500	AG
	453	Propane	500	AG
	455	Propane	1,000	AG
	455	Propane	1,000	AG
	456	Propane	1,000	AG
	457	JP-4	4,000	UG
Site No. 7	--	MOGAS	10,000	UG
	--	Diesel	1,000	UG

Appendix G
HAZARD ASSESSMENT RATING METHODOLOGY

USAF INSTALLATION RESTORATION PROGRAM
HAZARD ASSESSMENT RATING METHODOLOGY

BACKGROUND

The Department of Defense (DoD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DoD facilities. One of the actions required under this program is to:

> "develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts." (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Records Search phase of its Installation Restoration Program (IRP).

The first site rating model was developed in June 1981 at a meeting with representatives from the USAF Occupational and Environmental Health Laboratory (OEHL), Air Force Engineering and Services Center (AFESC), Engineering-Science (ES) and CH2M HILL. The basis for this model was a system developed for EPA by JRB Associates of McLean, Virginia. The JRB model was modified to meet Air Force needs.

After using this model for 6 months at over 20 Air Force installations, certain inadequacies became apparent. Therefore, on January 26 and 27, 1982, representatives of

USAF OEHL, AFESC, various major commands, Engineering Science, and CH2M HILL met to address the inadequacies. The result of the meeting was a new site rating model designed to present a better picture of the hazards posed by sites at Air Force installations. The new rating model described in this presentation is referred to as the Hazard Assessment Rating Methodology.

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air Force in setting priorities for follow-on site investigations and confirmation work under Phase II of IRP.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DoD program needs.

The model uses data readily obtained during the Record Search portion (Phase I) of the IRP. Scoring judgments and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly

no hazards at the site. This approach meshes well with the policy for evaluating and setting restrictions on excess DoD properties.

Site scores are developed using the appropriate ranking factors according to the method presented in the flow chart (Figure 1). The site rating form is provided on Figure 2 and the rating factor guidelines are provided in Table 1.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: the possible receptors of the contamination, the waste and its characteristics, the potential pathways for waste contaminant migration, and any efforts to contain the contamination. Each of these categories contains a number of rating factors that are used in the overall hazard rating.

The receptors category rating is calculated by scoring each factor, multiplying by a factor weighting constant, and adding the weighted scores to obtain a total category score.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned and for direct evidence 100 points are assigned. If no evidence is found, the highest score among three possible routes is used. These routes are surface-water migration, flooding, and ground-water migration. Evaluation of each route involves factors associated with the particular migration route. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The scores for each of the three categories are then added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Scores for sites at which there is no containment are not reduced. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the scores for the other three categories.

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FIGURE 1

HAZARD ASSESSMENT RATING METHODOLOGY FLOW CHART

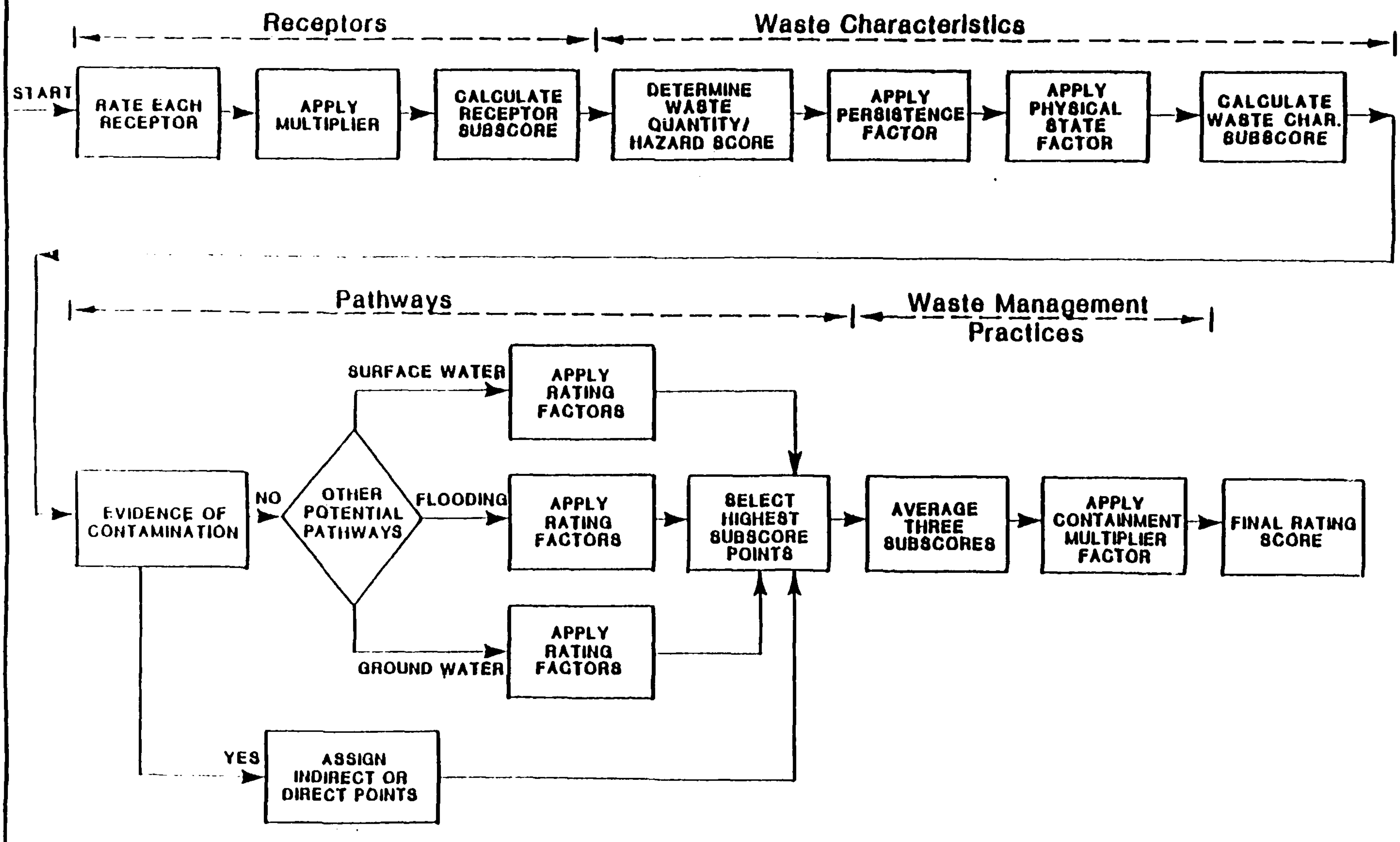

FIGURE 2

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE ______________________________

LOCATION ______________________________

DATE OF OPERATION OR OCCURRENCE ______________________________

OWNER/OPERATOR ______________________________

COMMENTS/DESCRIPTION ______________________________

SITE RATED BY ______________________________

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to reservation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Ground water use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by ground-water supply within 3 miles of site		6		
		Subtotals	______	______

Receptors subscore (100 X factor score subtotal/maximum score subtotal) ______

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) ______
2. Confidence level (C = confirmed, S = suspected) ______
3. Hazard rating (H = high, M = medium, L = low) ______

Factor Subscore A (from 20 to 100 based on factor score matrix) ______

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

______ X ______ = ______

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

______ X ______ = ______

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore ______

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		
		Subtotals	______	______

Subscore (100 X factor score subtotal/maximum score subtotal) ______

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding		1		

Subscore (100 x factor score/3) ______

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to ground water		8		
		Subtotals	______	______

Subscore (100 x factor score subtotal/maximum score subtotal) ______

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore ______

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors ______
Waste Characteristics ______
Pathways ______

Total ______ divided by 3 = ______
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

______ X ______ = ______

Table 1
HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A. Population within 1,000 feet (includes on-base facilities)	0	1-25	26-100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Land Use/Zoning (within 1-mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or Industrial	Residential	3
D. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	6
E. Critical environments (within 1-mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands	10
F. Water quality/use designation of nearest surface water body	Agricultural or Industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies	6
G. Ground-water use of uppermost aquifer	Not used, other sources readily available	Commercial, industrial, or irrigation, very limited other water sources	Drinking water, municipal water available	Drinking water, no municipal water available; commercial, industrial, or irrigation, no other water source available	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1-15	51-1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1-50	51-1,000	Greater than 1,000	6

Table 1--Continued

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)	S = Suspected confidence level
o Verbal reports from interviewer (at least 2) or written information from the records	o No verbal reports or conflicting verbal reports and no written information from the records
o Knowledge of types and quantities of wastes generated by shops and other areas on base	o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site

A-3 Hazard Rating

Rating Factors	Rating Scale Levels 0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

Table 1--Continued

II. WASTE CHARACTERISTICS--Continued

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	M
	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	S	M
	M	C	L
	L	S	L
30	S	C	L
	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:

Confidence Level
- o Confirmed confidence levels (C) can be added.
- o Suspected confidence levels (S) can be added.
- o Confirmed confidence levels cannot be added with suspected confidence levels.

Waste Hazard Rating
- o Wastes with the same hazard rating can be added.
- o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

Table 1--Continued

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 Potential for Surface Water Contamination

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($>10^{-6}$ cm/sec)	6
Rainfall intensity based on 1-year 24-hour rainfall	<1.0 inch	1.0 to 2.0 inches	2.1 to 3.0 inches	>3.0 inches	8

B-2 Potential for Flooding

Rating Factors	0	1	2	3	Multiplier
Floodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	Floods annually	1

B-3 Potential for Ground-Water Contamination

Rating Factors	0	1	2	3	Multiplier
Depth to ground water	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to + 20 inches	Greater than +20 inches	6
Soil permeability	Greater than 50% clay ($>10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 15% clay ($<10^{-2}$ cm/sec)	8

Table 1--Continued

B-3 Potential for Ground-Water Contamination--Continued

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. Waste Management Practices Factor

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Fire Protection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1, or III-6-3, then leave blank for calculation of factor score and maximum possible score.

GNR68A

Appendix H
SITE RATING FORMS

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 1--Engine Runup Area

LOCATION: AF Plant 42; Site No. 1

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Waste materials, primarily JP-4, engine oil, hydraulic fluids

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	124	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 69

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.8 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	69
Waste Characteristics	40
Pathways	35
Total 144 divided by 3 =	48.00
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

48.00 x 1.0 48

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-1--Paint Waste Disposal Ditch

LOCATION: AF Plant 42, Site No. 2

DATE OF OPERATION OR OCCURRENCE: 1954 to 1974

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Waste materials, primarily turco, toluene, MEK, and other strippers

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	2	4	8	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	120	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 67

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large)
2. Confidence level (C = confirmed, S = suspected)
3. Hazard rating (H = high, M = medium, L = low)

Factor Subscore A (from 20 to 100 based on factor score matrix)

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 1.0 = 100

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Char[illegible]

100 x 1.0 = 100

AD-A190 941 INSTALLATION RESTORATION PROGRAM RECORDS SEARCH FOR AIR FORCE PLANT 42 CALIFORNIA(U) CH2M HILL INC GAINESVILLE FL OCT 83 AFESC/DEV-42-IRP-002 F08637-80-G-0010-5003

3/3

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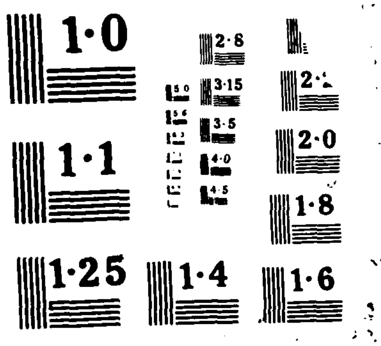
1·0
2·8
3·15
3·5
4·0
4·5
2·0
1·1
1·8
1·25
1·4
1·6

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	2	8	16	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	54	108
Subscore (100 x factor score subtotal/maximum score subtotal)				50
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	67
Waste Characteristics	100
Pathways	80
Total 247 divided by 3 =	82.33
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

82.33 x 1.0 82

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-2--Paint Waste Disposal Area

LOCATION: AF Plant 42, Site No. 2

DATE OF OPERATION OR OCCURRENCE: 1954 to 1956

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Waste materials, primarily paint wastes

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	124	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 69

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore --

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	69
Waste Characteristics	50
Pathways	35
Total 154 divided by 3 =	51.33
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51.33 x 1.0 51

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-3--Paint Waste Disposal Area

LOCATION: AF Plant 42, Site No. 2

DATE OF OPERATION OR OCCURRENCE: 1954 to 1956

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Waste materials included lacquer thinners, toluene, and MEK

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	124	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 69

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore **35**

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	69
Waste Characteristics	50
Pathways	35
Total 154 divided by 3 =	51.33
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51.33 x 1.0 **51**

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-4--Abandoned Disposal Area

LOCATION: AF Plant 42, Site No. 2

DATE OF OPERATION OR OCCURRENCE: 1954 to 1974

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Concrete and asphalt rubble, wooden crates, rubber hoses, drums

SITE RATED BY: G. McIntyre and K. Cable

I. RE...TORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	120	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 67

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore --

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	67
Waste Characteristics	40
Pathways	35
Total 142 divided by 3 =	47.33
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

47.33 x 1.0 47

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-5--Disposal Area

LOCATION: AF Plant 42, Site No. 2

DATE OF OPERATION OR OCCURRENCE: 1954 to 1956

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Waste materials included photochemicals, solvents, and vehicle maintenance waste

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	124	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 69

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore --

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	69
Waste Characteristics	40
Pathways	35
Total 144 divided by 3 =	48.00
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

48.00 x 1.0 48

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-6--Disposal Area

LOCATION: AF Plant 42, Site No. 2

DATE OF OPERATION OR OCCURRENCE: 1954 to 1981

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Waste materials included hydraulic oil, engine oil, solvents, and paint strippers

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	124	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 69

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 28

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	69
Waste Characteristics	50
Pathways	28
Total 147 divided by 3 =	49.00
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

49.00 x 1.0 = 49

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-7--Engine Runup Area

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1954 to 1978

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Fuel and engine oil disposal; leaky JP-4 and JP-7 fuel lines

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	2	4	8	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	120	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 67

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	67
Waste Characteristics	64
Pathways	35
Total 166 divided by 3 =	55.33
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

55.33 x 1.0 = 55

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-8--Engine Buildup Area

LOCATION: AF Plant 42, Site No. 2

DATE OF OPERATION OR OCCURRENCE: 1954 to 1957

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Waste oils and fuel

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	124	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 69

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 0.8 = 32

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

32 x 1.0 = 32

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	46	108
Subscore (100 x factor score subtotal/maximum score subtotal)				43
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 43

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	69
Waste Characteristics	32
Pathways	43
Total 144 divided by 3 =	48.00
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

48.00 x 1.0 = 48

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-9--Fuel Contaminated Ditch

LOCATION: AF Plant 42, Site No. 2

DATE OF OPERATION OR OCCURRENCE: 1954 to present

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Waste materials primarily fuel

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	2	4	8	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	120	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 67

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.8 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there i⁻ evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	100
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	2	8	16	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	54	108
Subscore (100 x factor score subtotal/maximum score subtotal)				50
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 100

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	67
Waste Characteristics	80
Pathways	100
Total 247 divided by 3 =	82.33
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

82.33 x 1.0 = 82

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-10--Disposal Area

LOCATION: AF Plant 42, Site No. 2

DATE OF OPERATION OR OCCURRENCE: 1954 to 1958

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Waste oils from aircraft

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	120	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 67

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

30 x 0.8 = 24

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

24 x 1.0 = 24

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

			Subscore	--

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	67
Waste Characteristics	24
Pathways	35
Total 126 divided by 3 =	42.00
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

42.00 x 1.0 42

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-11--Noise Level Area

LOCATION: AF Plant 42, Site No. 2

DATE OF OPERATION OR OCCURRENCE: 1954 to 1958

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Fuel, oils, and hydraulic fluids

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to reservation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface-water body	3	6	18	18
G. Ground-water use of uppermost aquifer	2	9	18	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	120	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 67

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 0.8 = 32

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

32 x 1.0 = 32

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore --

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	67
Waste Characteristics	32
Pathways	35
Total 134 divided by 3 =	44.67
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

44.67 x 1.0 = 45

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2-12--TEB Disposal Area

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1963 to present

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Triethylborine and hydraulic fluid

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	124	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 69

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.8 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	0
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	69
Waste Characteristics	40
Pathways	35
Total 144 divided by 3 =	48.00
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

48.00 x 1.0 = 48

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 3-1--Engine Runup Area

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1957 to 1961

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Primarily fuels

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	2	4	8	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	120	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 67

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.8 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	0
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	67
Waste Characteristics	40
Pathways	35
Total 142 divided by 3 =	47.30
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

47.30 x 1.0 = 47

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 3-2--Evaporation Ponds

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1963 to 1966

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Nickel plating wastewater

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	124	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 69

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	69
Waste Characteristics	40
Pathways	35
Total 144 divided by 3 =	48.00

Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

48.00 x 1.0 = 48

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 4-1--Fuel Transfer Area

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1954 to present

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Primarily JP-7, JP-4, and JP-TS

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	130	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 72

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

54 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	72
Waste Characteristics	48
Pathways	35
Total 155 divided by 3 =	51.67
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

51.67 x 1.0 52

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 5-1--Engine Runup Area

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1956 to 1971

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Primarily JP-4, engine oil, and solvents

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	124	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 69

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	69
Waste Characteristics	64
Pathways	80
Total 213 divided by 3 =	71.00
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

71.00 x 1.0 = 71

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 5-2--Fuel Disposal Area

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: Late 1950s

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Primarily fuels

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	124	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 69

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 0.8 = 32

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

32 x 1.0 = 32

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	69
Waste Characteristics	32
Pathways	35
Total 136 divided by 3 =	45.30
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

45.30 x 1.0 = 45

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 6-1--Engine Runup Area

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1955 to 1957

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Primarily fuels, oil, and hydraulic fluid

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	106	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 59

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 0.8 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	59
Waste Characteristics	40
Pathways	35
Total 134 divided by 3 =	44.70
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

44.70 x 1.0 = 45

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 7-1--Vehicle Washrack and Leaking Underground Tank

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1954 to present

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Primarily engine oil and hydraulic fluid

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	106	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 59

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	46	108
Subscore (100 x factor score subtotal/maximum score subtotal)				43
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	59
Waste Characteristics	48
Pathways	80
Total 187 divided by 3 =	62.30
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

62.30 x 1.0 = 62

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 7-2--Original Fire Department Training Area

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1956 to 1959

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Fire training pit--fuels, oils, and solvents

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	106	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 59

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.8 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore --

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	59
Waste Characteristics	80
Pathways	35
Total 174 divided by 3 =	58.00
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

58.00 x 1.0 = 58

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. C-1--Abandoned Fire Department Training Area

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1959 to 1981

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Fire training pit--fuels, solvents, and oils

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	112	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 62

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.8 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	62
Waste Characteristics	80
Pathways	35
Total 177 divided by 3 =	59.00
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

59.00 x 1.0 = 59

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. C-2--New Fire Department Training Area

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1981 to present

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Clean JP-4

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	112	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 62

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	62
Waste Characteristics	48
Pathways	35
Total 145 divided by 3 =	48.30
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

48.30 x 1.0 = 48

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. C-3--Landfill

LOCATION: AF Plant 42

DATE OF OPERATION OR OCCURRENCE: 1954 to present

OWNER/OPERATOR: AF Plant 42

COMMENTS/DESCRIPTION: Construction rubble and some fuels, oils, and solvents

SITE RATED BY: G. McIntyre and K. Cable

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	1	10	10	30
F.	Water quality of nearest surface-water body	3	6	18	18
G.	Ground-water use of uppermost aquifer	2	9	18	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	112	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 62

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 1.0 = 60

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

60 x 1.0 = 60

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore --

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding	0	1	0	100
	Subscore (100 x factor score/3)			0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	NA	8	--	--
		Subtotals	24	90
Subscore (100 x factor score subtotal/maximum score subtotal)				27

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	62
Waste Characteristics	60
Pathways	35
Total 157 divided by 3 =	52.30
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

52.30 x 1.0 = 52

END
DATE
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